Request for Bids

Negus Transfer Station
Pre-Engineered Metal Building

Deschutes County
Department of Solid Waste
61050 SE 27th Street
Bend, Oregon 97702

July 23, 2021

Deschutes County, Oregon
Department of Solid Waste
INVITATION TO BID
Negus Transfer Station Pre-Engineered Metal Building (PEMB)

Sealed bids will be received at the Deschutes County Department of Solid Waste, 61050 SE 27th Street, Bend, Oregon 97702, until but not after, 3:00 p.m. on August 17, 2021; at which time all bids for the above-entitled public works project will be publicly opened and read aloud.

The County is seeking procurement of a Pre-Engineered Metal Building (PEMB) package through a Manufacturer. The PEMB Work consists of pre-design, coordination, permitting, cost estimating, fabrication, and delivery of a PEMB structure housing operations for the transfer of municipal solid waste received at the County's Negus Transfer Station, located in Redmond, Oregon. The PEMB is part of a larger overall site improvement and construction project currently being designed by an Engineering and Architectural Consultant team. The Consultant team is contracted separately with the County and the overall project is at the Schematic Design milestone.

The overall project bid, including site work, other smaller structures, and PEMB erection will be by a General Contractor with Bid Advertisement by the County in a future, separate package.

Plans, specifications and other bid documents may be inspected at the Deschutes County Bids and RFPs web page (http://www.deschutes.org/rfps).

IMPORTANT: Prospective bidders downloading/accessing website-posted project plans, specifications and other bid documents MUST complete and submit the Contact Information Form provided on the website to provide contact information to receive follow-up documents (addenda, clarifications, etc). Failure to complete the Contact Information Form will result in bidder disqualification.

Bids shall be made on the forms furnished by the County, incorporating all contract documents, addressed and mailed or delivered to Deschutes County Department of Solid Waste, 61050 SE 27th Street, Bend, Oregon 97702 in a sealed envelope plainly marked "NEGUS TRANSFER STATION PRE-ENGINEERED METAL BUILDING" and the name and address of the bidder.

No bid will be considered by Deschutes County unless the bid contains a statement by the bidder that the provisions of ORS 279C.800 – 279C.870 are to be complied with. Each bid must contain a statement as to whether the bidder is a resident bidder, as defined in ORS 279A.120. Vendors shall use recyclable products to the maximum extent economically feasible in the performance of the contract work set forth in this document.

Deschutes County may reject any bid not in compliance with all prescribed bidding procedures and requirements, and may reject for good cause any or all bids upon a finding of Deschutes County it is in the public interest to do so. The protest period for this procurement is seven (7) calendar days.

Inquiries pertaining to this project shall be directed to Chad Centola, Interim Director of Solid Waste at (541) 322-7172 or chadc@deschutes.org.

Chad Centola,
Interim Director
Deschutes County Department of Solid Waste

PUBLISHED:
DESCHUTES COUNTY BIDS/RFP WEBSITE (https://www.deschutes.org/rfps): Monday, July 26, 2021
THE BEND BULLETIN: Wednesday, July 28 and Friday, July 30, 2021
DAILY JOURNAL OF COMMERCE: Wednesday, July 28 and Friday, July 30, 2021

INFORMATION FOR BIDDERS

1. General Description of Project. The County is currently in the Schematic Design phase for the construction of a new Solid Waste Transfer Station at a property known as the Negus Transfer Station, located in Redmond, Oregon. The project consists of significant site improvements and new accessory buildings including: scalehouse, truck scales, fire suppression water storage tank, septic system, and transfer station building.

To provide the best value to the County, the use of a long-span Pre-Engineered Metal Building (PEMB) has been identified by the County's Consultant team as the preferred structural system for the Transfer Station building.

The transfer station building is approximately 30,000-square feet, uninsulated, with customized architectural configuration. The PEMB will function as a shell over municipal solid waste (MSW) received at the facility where the waste is loaded into transfer trucks for final disposal at Knott Landfill in Bend, Oregon.

The procurement of the PEMB will be in two phases:

- **Bid Item 1:** Design, Coordination, and Permitting, to begin immediately upon award.
- **Bid Item 2:** Fabrication and Delivery, to be provided following the selection of the project General Contractor using overall construction schedule milestones. Milestones are to be determined.

This advertisement does not include: PEMB erection, architectural design, mechanical design, electrical design, foundation design, site improvements, or accessory building design.

Management: The County will manage the work of the PEMB Manufacturer during the Design and Permitting Phases, however the Work must be coordinated with the Consultant team.

The Design Phase documentation provided for Bidder reference is currently at a Schematic Design level and intended for use as an informative Bid procurement tool. The documentation provided is not for Construction or Permit. Final design is intended to be coordinated with the Work of this Invitation to Bid.

Pre-Bid Conference: The County will host a mandatory, virtual Pre-Bid conference. A link will be emailed to Bidders registered with Project Representative 24-hours prior.

Bidder Questions: All bidder questions shall be submitted in writing to the Project Representative using the project. The subject line MUST contain the Bid/RFP Reference Number. Bidders may not contact members of the design team to inquire about this project.

Advertisement and Bid Schedule

- Bid Advertisement
  - Deschutes County Website: July 26, 2021
  - Bend Bulletin & Daily Journal of Commerce July 28 and July 30, 2021
- Pre-Bid Conference, 3pm PST
  Mandatory, virtual link emailed to Registered Bidders: August 10, 2021
- Deadline for Bidder Questions, 3pm PST August 12, 2021
- Bid Opening, virtual, 3pm PST: August 17, 2021
- Contract Award: September 7, 2021

Project Representative: Chad Centola, chad.centola@deschutes.org

The Awarded Bidder will provide.

Bid Item 1.
Project Representative: A dedicated Project Representative experienced in the design, fabrication, and erection of PEMB Systems. The assigned Project Representative will communicate with the County directly and be the key personnel communicating and coordinating with the Consultant team.

Design Assistance: To the Consultant team and coordinate the Work of the PEMB using documentation provided within this invitation and communicated with the Consultant team through digital plan files (AutoCAD and 3-Dimensional format), printed plans, structural calculations, written recommendation of assemblies and systems, cost estimating assistance, attendance at Consultant coordination meetings, and permit submittal meetings.

Submittals:

1) Structural plans, elevations, sections, and details. At a 50% for Review, 100% for Review, For Permit, and For Construction Milestones.
2) Structural calculations including all loading required by the Authority Having Jurisdiction (AHJ).
3) 3D and AutoCAD coordination files to the Consultant team.
4) Materials, products, and approval drawings as required within Specification Section 13 3419 Metal Building Systems including Overhead Doors and Skylights.
5) Cost Estimate of changes updated regularly to inform the overall project estimating and budget effort.

Permit Documentation: Structural plans, specifications, and details sufficient to obtain a Building Permit in Deschutes County Oregon. Plans must be assembled under Oregon State Law following the local AHJ Amendments, stamped and signed by an Engineer Licensed in the State of Oregon.

Bid Item 2.
Fabrication and Delivery: Fabrication and delivery method shall be identified by the Awarded Bidder. Fabrication and Delivery will not commence until the Overall project is awarded to a General Contractor. The Fabrication and Delivery shall be coordinated with the overall construction schedule provided by the awarded General Contractor, such schedule is not yet available however, award is anticipated to be in Q2 of 2022.

Assembly Documentation: Plans, details, baseplate details, and assembly instructions to be used by the awarded General Contractor for erection and installation of the Work.

Schedule: Provide a schedule indicating number of days for the following items, the schedule will be coordinated with the project design schedule and used to inform the Awarded General Contractor (future):

1. Design Milestones
2. Permit Documentation
3. Fabrication Time
4. Delivery
5. Estimated Erection and Assembly Duration

Contract Exclusions: The following specifications and products are excluded from the Work of this Bid. Design specifications have been provided for reference to coordinate with the work of

other trades. All other components, products, and materials to make a complete building envelope shall be the responsibility of the PEMB manufacturer to provide.

This advertisement does not include: PEMB erection, architectural design, mechanical design, electrical design, foundation design, site improvements, or accessory building design.

Excluded Specifications:

08 4113 Aluminum Framed Entrances and Storefronts
08 5113 Aluminum Windows
08 8000 Glazing
08 9000 Louvers and Vents
Door Hardware

2. **Contract Documents.** The Contract documents under which it is proposed to execute the work consist of the material bound herewith. These Contract documents are intended to be mutually complementary and to provide all details reasonably required for the execution of the proposed work.

   Any person contemplating the submission of a proposal and being in doubt as to the meaning or intent of said contract document shall at once notify, in writing, the Solid Waste Department Director of Deschutes County, Oregon. Any interpretation of change will be mailed or delivered to each person receiving a set of documents.

3. **Form of Proposals.** All proposals must be submitted on the forms furnished.

4. **Substitutions.** Materials and/or products called for in the specifications are named in order to establish standards of quality and design. Manufacturers or suppliers of such products similar to those specified may submit bids on the work providing requests for approval of substitution materials are made at least seven (7) calendar days prior to the bid opening. Adequate information on which to base approval or disapproval must be furnished to the Solid Waste Department Director or his representative and the Solid Waste Department shall be the sole judge of any request. When the Solid Waste Director approves a substitution, it is with the understanding that the Contractor guarantees the substituted article or materials to be equal to or better than that specified.

5. **Preparation of Proposals.** All blank spaces in the proposal form must be filled in, in ink, or typed, in both words and figures where required. No changes shall be made in phraseology of the forms. Written amount shall govern in cases of discrepancy between the amount stated in writing and amount stated in figures.

   Any proposal shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or which, in any manner shall fail to conform to the conditions of the published invitation to bidders.

   The bidder shall sign his proposal in the blank space provided therefore. Proposals made by corporations or partnerships shall contain names and addresses of the principal officers or partners therein. If a corporation makes a proposal, it must be signed by one of the principal officers thereof, and the corporate seal affixed.

   If made by a partnership, it must be signed by one of the partners, clearly indicating that he is signing as a partner of the firm. In the case of a proposal made by a joint venture, each of the joint venturers must sign the proposal in his personal capacity.

The wording of the proposal shall not be changed. Any additions, conditions, limitations or provisions inserted by the bidder will render the proposal irregular and may cause its rejection.

All Bids must be submitted on the Bid Proposal and Bid Schedule forms provided in these Contract Documents.

6. **Submission of Proposals.** All proposals must be submitted in the time and place and in the manner prescribed in the Invitation to Bid. Proposals must be made on the prescribed proposal forms furnished. Each proposal must be submitted in a sealed envelope, so marked as to indicate its contents without being opened. If the proposal is submitted by mail, the sealed envelope containing the bid must be enclosed in a separate envelope plainly addressed for mailing to conformance with instructions in the Invitation to Bid. **NOTE: A proposal must include completed original set of the Bid Proposal and Bid Schedule forms provided in these Contract Documents.**

7. **Modification or Withdrawal of Proposal.** Any bidder may modify his bid by written or electronic (facsimile or email) communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the County prior to the bid closing time, and provided further that a written confirmation of an electronic modification over the signature of the bidder was mailed prior to the bid closing time. If written confirmation of an electronic communication is not received within at least two calendar days of the closing time, no consideration will be given to the modification. The written or electronic communication should not reveal the bid price, but should state the addition or subtraction or other modification so that the County will not know the final prices or terms until the sealed bid is opened.

   Proposals may be withdrawn prior to the scheduled time for the opening of the proposals either by telecommunication (facsimile) or written request, or in person. No proposal may be withdrawn after the time scheduled for opening of proposals, unless the County has failed to comply with the time limits applicable to award of the Contract.

8. **Conditions of Work.** Each bidder must inform himself of the conditions relating to the execution of the work, and make himself thoroughly familiar with all the Contract documents. Failure to do so will not relieve the successful bidder of his obligations to enter into a Contract and complete the contemplated work in strict accordance with the Contract documents.

   Each bidder must inform himself on all laws and statutes, both Federal and State, relative to the regular execution of the work, the employment of labor, protection of public health, access to the work and similar requirements.

9. **Award of Contract.** The award of the contract will be made by the County on the basis of the proposal which in its sole and absolute judgment will best serve the interest of the County.

   County will issue a notice of intent to award contract. Any bidder may protest the notice of intent to award contract within seven (7) calendar days of the notice of intent to award contract.

   The County reserves the right to accept or reject any or all proposals, and to waive any informalities and irregularities in said proposals.

10. **Payment and Retainage.** Payment for work performed will be made by the County as specified in the Special Provisions based upon the contract unit prices on the Bid Schedule.

    Upon substantial completion of the contract, Contractor may request a partial release of retainage held by the County. The maximum amount of a request for a partial release retainage

shall be the Contract amount less 150 percent of the estimated cost of the Contract yet to be performed through final completion. Upon final completion, Contractor may request release of the remaining retainage. Each request for the release of retainage shall be accompanied by the Consent of the contractor's surety.

11. **Performance Bond.** The successful bidder shall file with the County, at the time of execution of the contract, a Performance Bond of not less than the contract price on the forms furnished by the County. The Surety Company furnishing the required bonds shall have a sound financial standing and a record of service satisfactory to the County, and shall be authorized to do business in the State of Oregon. In lieu of a Performance Bond, the contractor may file cash, a Certified or Cashier's Check made payable to Deschutes County, Oregon. This money, check or certificate will be held by the County conditioned on and subject to the same provisions as set forth in the attached Performance Bond.

County may request a copy of Contractor's surety bond(s). Contractor must supply County with copy of surety bond(s) within ten (10) calendar days from the date of the request.

12. **Failure to Execute Contract.** Upon failure by the successful bidder to enter into the Contract and furnish the necessary bond within ten (10) calendar days from the date Notice of Award is made, the bid security accompanying the bid shall be forfeited, the proceeds paid to the County, and the award withdrawn. The award may then be made to the next lowest responsible bidder, or all bids rejected and work is re-advertised.

13. **Disclaimer of Responsibility.** Neither the County nor the Director of Solid Waste will be responsible for oral interpretations. Should a bidder find discrepancies in, or omissions from the drawings, specifications, or other pre-bid documents, or be in doubt as to their meaning, bidder shall notify the County at least seven (7) calendar working days prior to the bid opening date. Any and all such interpretations, any supplemental instructions or approval of manufacturer's materials to be substituted will be made only in the form of written addenda to the specifications, which, if issued, will be hand delivered or sent by regular mail, email and fax to all prospective bidders receiving a set of such documents, not later than two (2) calendar days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued are to be covered in the bid for such addenda to become part of the Contract.

14. **Permits and Licenses.** The successful bidder shall be required to have or obtain, at his expense, any and all permits and licenses required by Deschutes County, any City within the County, and the State of Oregon, pertaining to the service he proposes to furnish. Licensing shall include without limitation registration with Construction Contractors Board and in the case of professional engineers and architects proof of current licensing with the appropriate State licensing board.

15. **Minimum Requirements of Bid.** The following minimum requirements as to the form and manner of submitting bids must be strictly observed; variance from these requirements will result in rejection of the bid as unresponsive.

A. Each Bid must be submitted on forms furnished by the County, and include a complete original set the Bid Proposal and Bid Schedule forms provided in these Contract Documents.

B. Each Bid must be signed by the bidder.

C. Each blank in the proposal must be filled in unless an alternative is provided. Each separate bid item must be bid on, unless the proposal form clearly indicates otherwise.

D. Each Bid must be submitted in a separate sealed envelope, marked to identify without opening, and in the hands of the Solid Waste Department Director at the time and place specified for bid opening.

E. A proposal containing modifications, deletions, exceptions or reservations which in any way conflict with or purport to alter any substantive provision contained in the bid documents, will not be considered.

F. A conditional bid will not be considered.

G. Any bid submitted without all of the pages of the bid documents, but with a sufficient number of the pages of the bid documents to allow the evaluation of the bid, shall be deemed to have been submitted with the missing pages for purposes of bid evaluation. The missing pages of the bid documents shall be deemed to be incorporated into bid by reference.

16. **Plans.** Plans are not to be taken or construed as being reproduced at precisely the indicated scale. Where the plans are photographic reductions of the original tracings, the approximate amount of reduction is indicated by a note on the plans.

17. **Specifications.** The specifications are the minimum acceptable specifications for the project for which proposals are sought. Any deviation from the specifications contained herein, shall render the bid non-responsive.

18. **Examination of Site and Conditions.** Bidders are required, prior to submission of bids, to carefully examine the site and the Plans and Specifications of the contemplated work. Errors and omissions in the Plans or Specifications shall be called to the attention of the Solid Waste Department Director prior to submission of bid so that addenda may be issued. Failure to do so on the part of the Contractor does not relieve him of responsibility for a correct and completely finished job. Only a written interpretation or correction by addendum shall be binding.

19. **Pre-Bid Inquiries.** Bidders with pre-bid inquires shall contact Chad Centola, Interim Director of Deschutes County Solid Waste Department at (541) 322-7172 or chadc@deschutes.org.

20. **Qualification of Bidders.** Contractors and subcontractors need not be licensed under ORS 468A.720. This contract is subject to ORS 279C.800 to 279C.870. The successful bidders and subcontractors providing labor shall maintain a qualified drug-testing program for the duration of the contract. Contractors and subcontractors need not be licensed under ORS 468.710.

The County may make any further investigation deemed necessary to resolve any doubt as to the bidder's qualifications, and the bidder shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted or investigation of such bidder fails to satisfy the County that such bidder is in all respects able to adequately perform the obligations of the Contract and to complete the work contemplated therein.

Any bidder who is disqualified may appeal his disqualification to the Board of County Commissioners of Deschutes County, Oregon, which is the local public contract review board as provided by State Law. Written notice of such appeal must be filed with the Board of County Commissioners by the close of business on the third County business day following the bidder's receipt of notice that he is disqualified.

If a bidder has appealed his disqualification within the time provided, but there has been no disposition of the appeal by the Board of County Commissioners, he may submit his sealed bid

on a form marked, "SAMPLE ONLY, NOT TO BE USED FOR BIDDING", and sealed in an envelope marked the same. His bid will not be opened, but will be forwarded to the Board of County Commissioners. If after considering the matter, the Board of County Commissioners determines that the bidder is qualified, the Board shall open and read the bid, and it shall be considered with all other bids. If the bidder is not found qualified after appeal, the bid will be opened, copied and returned to the disqualified bidder. The bid shall not be read publicly, and the Board of County Commissioners action on appeal; or its public disclosure is mandated under the procedure as specified in ORS 192.480 or 192.490.

24. **Contract Award.** Deschutes County reserves the right to postpone award of the contract for fourteen (14) calendar days from the date of the bid opening, or until a final decision is made on a protest, whichever is later.

25. **Bidder Statement.** Submission of a bid for the project shall constitute a statement by the bidder that the provisions of ORS 279C.840 are to be complied with.

GENERAL CONDITIONS

1. **Contracting Agency Payments.** If the Contractor fails, neglects, or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or Subcontractor by any person, or the assignee of the person, in connection with the public works contract as such claim becomes due, the proper officer or officers of the public contracting agency may pay such claim and charge the amount of the payment against funds due or to become due the Contractor by reason of the Contract.

2. **Interest Rate For Failure to Make Payment.** If Contractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with this contract for a public improvement within 30 days after receipt of payment from the County or a Contractor, the Contractor shall owe the person the amount due plus interest charges commencing at the end of the 10-day period that payment is due under ORS 279C.580(4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest charged to the Contractor or first-tier subcontractor on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after the date when payment was received from the County or from the Contractor, but the rate of interest shall not exceed 30 percent. The amount of interest may not be waived.

3. **Construction Contractors Board Complaint.** If Contractor or a subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with this contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.

4. **Independent Contractor.** Contractor is engaged hereby as an independent contractor, and will be so deemed for purposes of the following:

   A. Contractor will be solely responsible for payment of any Federal or State taxes required as a result of this Agreement.

   B. This Contract is not intended to entitle Contractor to any benefits generally granted to County employees. Without limitation, but by way of illustration, the benefits which are not intended to be extended by this Contract to the Contractor are vacation, holiday and sick leave, other leaves with pay, tenure, medical and dental coverage, life and disability insurance, overtime, Social Security, Workers' Compensation, unemployment compensation, or retirement benefits (except insofar as benefits are otherwise required by law if the Contractor is presently a member of the Public Employees Retirement System).

   C. Contractor is an independent contractor for purposes of the Oregon Workers' Compensation law (ORS Chapter 656) and is solely liable for any Workers' Compensation coverage under this Contract. If Contractor has the assistance of other persons in the performance of this Contract, the Contractor shall qualify and remain qualified for the term of this Contract as a direct responsibility employer under ORS 656.407, and furnish County with evidence of said insurance. If Contractor performs this contract without the assistance of any other person, Contractor shall execute a Joint Declaration with County's Workers' Compensation carrier absolving County of any and all liability from Workers' Compensation provided in ORS 656.029 (2).

5. **Delegation and Reports.** Contractor shall not delegate the responsibility for providing services hereunder to any other individual or agency, and shall provide County with periodic reports to County at the frequency and with the information prescribed to be reported by County.

6. **Constraints.** Pursuant to the requirements of ORS 279C.500 through 279C.540 and Article XI, Section 10, of the Oregon Constitution, the following terms and conditions are made a part of this Agreement:

A. Contractor shall:

1) Make all payments promptly, as due, to all persons supplying to Contractors labor or materials for the prosecution of the work provided for in this agreement.
2) Pay all contributions or amounts due the Industrial Accident Fund from such contractor or subcontractor incurred in the performance of this Agreement.
3) Not permit any lien or claim to be filed or prosecuted against County on account of any labor or material furnished.
4) Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.
5) Demonstrate that an employee drug testing program is in place prior to execution of this Contract.

B. If Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to Contractor or a subcontractor by any person in connection with this agreement as such claim becomes due, the proper officers representing County may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due Contractor by reason of this agreement.

C. Employees of Contractor shall be paid at least time and a half for all overtime worked in excess of eight hours a day or forty (40) hours in any one week when the work week is five consecutive days, Monday through Friday; or for all overtime in excess of 10 hours a day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday, except individuals under this contract who are excluded under ORS 653.010 to 653.261 or under 29 U.S.C. Sections 201 to 209 from receiving overtime.

D. Employees of Contractor providing labor shall be paid at least time and a half for all work performed on Saturday and Sunday and the following legal holidays:

1) New Year's Day on January 1.
2) Memorial Day on the last Monday in May.
3) Independence Day on July 4.
4) Labor Day on the first Monday in September.
5) Thanksgiving Day on the fourth Thursday in November.
6) Christmas Day on December 25.

E. An employer must give notice to employees who perform work under this agreement in writing, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that employees may be required to work.

F. Contractor shall promptly, as due, make payment to any person or partnership, association or corporation furnishing medical, surgical and hospital care or other needed care and attention incident to sickness and/or injury to the employees of Contractor, of all sums which Contractor agrees to pay for such services, and all monies and sums which Contractor

collected or deducted from the wages of Contractor's employees pursuant to any law, contract or agreement for the purpose of providing or paying for such services.

G. This Agreement is expressly subject to the debt limitation of Oregon counties set forth in Article XI, Section 10, of the Oregon Constitution, and is contingent upon funds being appropriated therefore. Any provision herein which would conflict with law are deemed inoperative to that extent.

H. All subject employers working under this contract are either employers that will comply with ORS 656.017 or are employers that are exempt under ORS 656.126

7. Early Termination. This Contract may be terminated as follows:

A. Mutual Consent. County and Contractor, by mutual written agreement, may terminate this Contract at any time.

B. Party's Convenience. County or Contractor may terminate this Contract for any reason upon 30 calendar days written notice to the other party.

C. For Cause. County may also terminate this Contract effective upon delivery of written notice to the Contractor, or at such later date as may be established by the County, under any of the following conditions:

1) If funding from state or other sources is not obtained and continued at levels sufficient to allow for the purchase of the indicated quantity of services as required in this contract. This Contract may be modified to accommodate the change in available funds.
2) If state laws, regulations or guidelines are modified, changed or interpreted in such a way that the services are no longer allowable or appropriate for purchase under this Contract or are no longer eligible for the funding proposed for payments authorized by this contract.
3) In the event sufficient funds shall not be appropriated for the payment of consideration required to be paid under this contract, and if County has no funds legally available for consideration from other sources.
4) If any license or certificate required by law or regulation to be held by the Contractor to provide the services required by this Contract is for any reason denied, revoked, suspended, not renewed or changed in such a way that the Contractor no longer meets requirements for such license or certificate.

D. Contractor Default or Breach. The County, by written notice to the Contractor, may immediately terminate the whole or any part of this Contract under any of the following conditions:

1) If the Contractor fails to provide services called for by this Contract within the time specified or any extension thereof.
2) If the Contractor fails to perform any of the other requirements of this Contract or so fails to pursue the work so as to endanger performance of this Contract in accordance with its terms, and after receipt of written notice from the County specifying such failure, the Contractor fails to correct such failure within 10 calendar days or such other period as the County may authorize.
3) Contractor institutes or has instituted against it insolvency, receivership or bankruptcy proceedings, makes an assignment for the benefit of creditors, or ceases doing business on a regular basis.

E. County Default or Breach. Contractor may terminate this Contract in the event of a breach of this Contract by the County. Prior to such termination, the Contractor shall give to the County written notice of the breach and intent to terminate. If the County has not entirely cured the breach within 10 calendar days of the date of the notice, then the Contractor may terminate this Contract at any time thereafter by giving notice of termination.

8. Payment on Early Termination. Upon termination pursuant to paragraph 10, payment shall be made as follows:

A. If terminated under subparagraphs 10 a. through c. of this Contract, the County shall pay Contractor for work performed prior to the termination date if such work was performed in accordance with the Contract. County shall not, however, pay Contractor for any obligations or liabilities incurred by Contractor after Contractor receives written notice of termination.

B. If this Contract is terminated under subparagraph 10 d. of this Contract, County obligations shall be limited to payment for services provided in accordance with this Contract prior to the date of termination, less any damages suffered by the County.

C. If terminated under subparagraph 10 e. of this Contract by the Contractor due to a breach by the County, then the County shall pay the Contractor for work performed prior to the termination date if such work was performed in accordance with the Contract (a) with respect to services compensable on an hourly basis, for unpaid invoices, hours worked within any limits set forth in this Contract but not yet billed, authorized expenses incurred and interest within the limits set forth under ORS 293.462, and (b) with respect to deliverable-based Work, the sum designated for completing the deliverable multiplied by the percentage of Work completed and accepted by County, less previous amounts paid and any claim(s) that County has against Contractor. In no event shall County be liable to Contractor for any expenses related to termination of this Contract or for anticipated profits.

9. Remedies. In the event of breach of this Contract the parties shall have the following remedies:

A. Termination under subparagraphs 10 a. through c. of this Contract shall be without prejudice to any obligations or liabilities of either party already reasonably incurred prior to such termination. Contractor may not incur obligations or liabilities after Contractor receives written notice of termination. Additionally, neither party shall be liable for any indirect, incidental, consequential or special damages under this Contract or for any damages of any sort arising solely from the termination of this Contract in accordance with its terms.

B. If terminated under subparagraph 10 d. of this Contract by the County due to a breach by the Contractor, County may pursue any remedies available at law or in equity. Such remedies may include, but are not limited to, termination of this contract, return of all or a portion of this Contract amount, payment of interest earned on this Contract amount, and declaration of ineligibility for the receipt of future contract awards. Additionally, County may complete the work either itself, by agreement with another Contractor, or by a combination thereof. If the cost of completing the work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then the Contractor shall pay to the County the amount of the reasonable excess.

C. In addition to the remedies in paragraphs 10 through 12 of this Contract for a breach by the Contractor, the County also shall be entitled to any other equitable and legal remedies that are provided by law.

D. If previous amounts paid to Contractor exceed the amount due to Contractor under this Contract, Contractor shall repay any excess to County upon demand.

E. If the County breaches this Contract, Contractor's sole monetary remedy shall be (a) with respect to services compensable on an hourly basis, a claim for unpaid invoices, hours worked within any limits set forth in this Contract but not yet billed, authorized expenses incurred and interest within the limits set forth under ORS 293.462, and (b) with respect to deliverable-based Work, a claim for the sum designated for completing the deliverable multiplied by the percentage of Work completed and accepted by County, less previous amounts paid and any claim(s) that County has against Contractor. In no event shall County be liable to Contractor for any expenses related to termination of this Contract or for anticipated profits.

F. Neither County nor Contractor shall be held responsible for delay or default caused by fire, civil unrest, labor unrest, riot, acts of God, or war where such cause was beyond reasonable control of County or Contractor, respectively. Contractor shall, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon the cessation of the cause, diligently pursue performance of its obligations under this Contract. For any delay in performance as a result of the events described in this subparagraph, Contractor shall be entitled to additional reasonable time for performance that shall be set forth in an amendment to this Contract.

G. The passage of this Contract expiration date shall not extinguish or prejudice the County's or Contractor's right to enforce this Contract with respect to any default or defect in performance that has not been cured.

H. County's remedies are cumulative to the extent the remedies are not inconsistent, and County may pursue any remedy or remedies singly, collectively, successively or in any order whatsoever.

10. <u>Contractor's Tender Upon Termination.</u> Upon receiving a notice of termination of this Contract, Contractor shall immediately cease all activities under this Contract unless County expressly directs otherwise in such notice of termination. Upon termination of this Contract, Contractor shall deliver to County all documents, information, works-in-progress and other property that are or would be deliverables had this Contract been completed. Upon County's request, Contractor shall surrender to anyone County designates, all documents, research, objects or other tangible things needed to complete the work.

11. <u>Work Standard.</u> Contractor shall be solely responsible for and shall have control over the means, methods, techniques, sequences and procedures of performing the work, subject to the plans and specifications under this Contract and shall be solely responsible for the errors and omissions of its employees, subcontractors and agents. For goods and services to be provided under this contract, Contractor agrees to:

A. Perform the work in a good, workmanlike, and timely manner using the schedule, materials, plans and specifications approved by County;

B. Comply with all applicable legal requirements;

C. Comply with all programs, directives, and instructions of County relating to safety, storage of equipment or materials;

D. Take all precautions necessary to protect the safety of all persons at or near County or Contractor's facilities, including employees of Contractor, County and any other contractors or subcontractors and to protect the work and all other property against damage.

12. **Hold Harmless.** To the fullest extent allowed by law Contractor shall indemnify, save harmless and defend the County from and against all claims, suits or actions for damages, costs, losses and expenses arising from Contractor's torts, as the term "tort" is defined in ORS 30.260(8).

13. **Contractor Not An Agent of County.** It is agreed by and between the parties that Contractor is not carrying out a function on behalf of County, and County does not have the right of direction or control of the manner in which Contractor delivers services under this agreement or exercise any control over the activities of Contractor.

14. **Partnership.** County is not, by virtue of this Contract, a partner or joint venturer with Contractor in connection with activities carried out under this Contract, and shall have no obligation with respect to Contractor's debts or any other liabilities of each and every nature.

15. **Insurance.** In conjunction with all services performed under this agreement: Contractor shall furnish proof of the types and amounts of insurance indicated in the Insurance Requirements form, attached hereto and by this reference incorporated herein. County reserves the right to require completed, certified copies of all required insurance policies, at any time.

16. **Non-Discrimination.** Contractor agrees that no person shall, on the grounds of race, color, creed, national origin, sex, marital status, or age, suffer discrimination in the performance of this Agreement when employed by Contractor. Contractor agrees to comply with Title VI of the Civil Rights Act of 1964, with Section V of the Rehabilitation Act of 1973, and with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. Additionally, each party shall comply with the Americans with Disabilities Act of 1990 (Pub. L. No. 101-336), ORS 659A.112, and all regulations and administrative rules established pursuant to those laws.

17. **Non-Appropriation.** In the event sufficient funds shall not be appropriated for the payment of consideration required to be paid under the Contract, and if County has no funds legally available for consideration from other sources, then County may terminate this agreement in accordance with Paragraph 10 of these General Conditions.

18. **Attorney Fees.** In the event an action, lawsuit or proceeding, including appeal there from, is brought for failure to observe any of the terms of this Agreement, each party shall be responsible for their own attorney's fees, expenses, costs and disbursements for said action, suit, proceeding or appeal.

19. **Claim, Action, Suit or Proceeding.** This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law. Any claim, action, suit or proceeding (collectively, "Claim") between County and Contractor that arises from or relates to this Contract shall be brought and conducted solely and exclusively within the Circuit Court of Deschutes County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. THE RECIPIENT, BY EXECUTION OF THIS CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF SAID COURTS.

20. **Land Use Permit.** This contract does not constitute a land use permit, nor does acceptance of this Contract by Contractor constitute approval of any legislative or quasi-judicial action required as a condition precedent to use of the land for the intended purpose.

21. **Drug Testing Program.** The drug testing program in place at execution of this Contract shall remain in place for the duration of the Contract.

22. **Records Maintenance; Right to Audit Records.**

A. Records Maintenance; Access. Contractors and subcontractors shall maintain all fiscal records relating to Contracts in accordance with generally accepted accounting principles ("GAAP"). In addition, Contractors and subcontractors shall maintain all other records necessary to clearly document:

1) Their performance; and
2) Any claims arising from or relating to their performance under this Contract. Contractors and subcontractors shall make all records pertaining to their performance and any claims under a Contract (the books, fiscal records and all other records, hereafter referred to as "Records") accessible to the County at reasonable times and places, whether or not litigation has been filed as to such claims.

B. Inspection and Audit. County may, at reasonable times and places, have access to and an opportunity to inspect, examine, copy, and audit the Records of any Entity that has submitted cost or pricing data according to the terms of a Contract to the extent that the Records relate to such cost or pricing data. If the Entity must provide cost or pricing data under a Contract, the Entity shall maintain such records that relate to the cost or pricing data for 3 years from the date of final payment under the Contract, unless a shorter period is otherwise authorized in writing.

C. Records Inspection; Control Audit. County, and its authorized representatives, shall be entitled to inspect, examine, copy, and audit any Contractor's or subcontractor's Records, as provided in Section A of this rule. The Contractor and subcontractor shall maintain the Records and keep the Records accessible and available at reasonable times and places for a minimum period of 3 years from the date of final payment under the Contract or subcontract, as applicable, or until the conclusion of any audit, controversy or litigation arising out of or related to the Contract, whichever date is later, unless a shorter period is otherwise authorized in writing.

23. **Contract Rules.** The rules applicable to this contract are the Attorney General's Model Public Contract Rules, Chapter 137-046 and Chapter 137-049, as presently constituted and Deschutes County Code (DCC) Chapter 2.37. The provisions of DCC Chapter 2.37.150 are incorporated herein by reference. These provisions may be viewed at the following web address: http://www.co.deschutes.or.us/dccode/Title2/docs/Chapter%202.37doc

24. **Contractor Certifies.** By execution of this contract, Contractor certifies, under penalty of perjury, that:

A. To the best of Contractor's knowledge, Contractor is not in violation of any tax laws described in ORS 305.380(4), and

B. Contractor has not discriminated against minority, women or small business enterprises in obtaining any required subcontracts.

25. **Contract Provisions.** Contractor shall make all provisions of this contract with the County applicable to any subcontractor performing work under the contract.

26. **Contract Content.** This Contract and attached exhibits and attachments constitute the entire agreement between the parties on the subject matter hereof. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Contract. No waiver, consent, modification or change of terms of this Contract shall bind either party unless in writing and signed by both parties and all necessary County approvals have been obtained. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. The failure of the County to enforce any provision of this Contract shall not constitute a waiver by County of that or any other provision.

BID PROPOSAL

To: Deschutes County Department of Solid Waste
61050 SE 27th Street
Bend, Oregon 97702

Project Name: Negus Transfer Station
Pre-Engineered Metal Building

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this Proposal are those named herein; that this Proposal is, in all respects, fair and without fraud; and it is made without collusion with any official of Deschutes County, Oregon, hereinafter called County; and that the Proposal is made without any connection or collusion with any person making another proposal on this Contract.

The Bidder further declares that he has carefully examined the Contract documents; that he has satisfied himself as to the quantities involved, including materials and equipment, and conditions of work involved; and that this proposal is made according to the provisions and under the terms of the Contract documents, which documents are hereby made a part of this Proposal.

The Bidder agrees that all of the applicable provisions of Oregon law relating to public contracts (ORS Chapter 279) are, by this reference, incorporated in and made a part of this Proposal. Bidder hereby states that bidder will comply with ORS 279C.840.

Bidder (is) (is not) a resident bidder of the State of Oregon. If Bidder is a resident of another state, specify state of residency: _____.

The Bidder further agrees that if this Proposal is accepted, he will, within ten (10) calendar days after notification of acceptance, execute the contract with the County in the form of contract annexed hereto; and will, at the time of execution of the contract, deliver to the County the Performance and Payment Bonds (See Section 13 - Information for Bidders) required herein; and will, to the extent of this Proposal, furnish all materials necessary to complete the work in the manner, in the time, and according to the methods as specified in the contract documents and required by the Director of Solid Waste.

Bidder certifies that it has a drug testing program in place for its employees, or warrants that a drug testing program will be in place prior to execution of this contract, that the drug testing program is in writing, that new employees must pass a drug screening, that existing employees may be tested for reasonable cause or when an employee is injured or involved in an accident resulting in property damage. Bidder agrees that each subcontractor providing labor under this Contract shall maintain a qualifying drug testing program for the duration of the Contract.

The Bidder agrees to commence work upon the issuance of a "Notice to Proceed" by the County and fully complete the project according to the time schedule specially set forth in the contract documents. Bidder further agrees to pay liquidated damages for failure to complete within the specified time.

It is agreed that if the Bidder is awarded the contract for the work herein proposed and shall fail or refuse to execute the contract and furnish the contract and furnish the specified Performance and Payment Bond within ten (10) calendar days after receipt of notification of acceptance of his proposal, then, in that event, the bid security deposited herewith according to the conditions of the Invitation to Bid and Information for Bidders shall be retained by the County as liquidated damages; and it is agreed that the said sum is a fair measure of the amount of damage the County will sustain in case the Bidder shall fail or refuse to enter into the contract for the said work and to furnish the Performance and Payment Bond (See Section 13 Information for Bidders) as specified in the contract documents. Bid security in the form of a certified check shall be subject to the same requirements as a bond.

If the Bidder is awarded a contract on this Proposal, the Surety who will provide the performance bond will be

_____, whose address is

_____

STREET CITY STATE ZIP

BID SCHEDULE
NEGUS TRANSFER STATION
PRE-ENGINEERED METAL BUILDING

Bid Format: Lump Sum, listed in whole US Dollars.

Important: BID ITEM 1 may be equal to, but no more than 3% of the value listed for BID ITEM 2.

BID ITEM 1: $_____
BID ITEM 2: $_____

TOTAL BID PRICE: $ _____

TOTAL: BID PRICE (written words):

_____

NOTES: A. Bidder must bid on all items #1 through #2.

B. The successful Bidder must post a Performance Bond in the amount of one hundred percent (100%) of the awarded contract amount Total Bid Price to guarantee that the successful bidder will fulfill all of his obligations under this Contract.

ACKNOWLEDGEMENT OF PRE-BID CONFERENCE ATTENDANCE

Signature Date

_____ _____

ACKNOWLEDGEMENT OF ADDENDUMS

The undersigned acknowledges receipt of and has incorporated the addenda listed below in the Total Bid Price submitted herein:

Addenda #	Signature	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

It is understood that the right is reserved by Deschutes County to reject any or all proposals or bids. In the event that the Contract is not awarded within thirty (30) days after the receipt of bids, the Bidder will be released from his bid unless an extension of time is mutually agreed upon.

The undersigned certifies the bid prices contained in this proposal or bid have been carefully checked and are submitted as correct and final.

The name of the Bidder submitting this Proposal is:

_____

Name

_____ _____

Telephone Number Fax Number

_____

Email Address

The address to which all communication concerning this proposal and the Contract shall be sent is:

_____

The names of the principal officers of the corporation submitting this Proposal, or of the partnership, or of all persons interested in this Proposal as principals, are as follows:

_____ _____

_____ _____

(IF SOLE PROPRIETOR OR PARTNERSHIP)

IN WITNESS HERETO, the undersigned has set his/her hand this _____ day of_____, 2021.

_____

Signature of Bidder

_____

Title

(IF CORPORATION)

IN WITNESS WHEREOF, the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this _____ day of _____, 2021.

_____
Name of Corporation

By:_____

Title: _____

Attest: _____
Signature and Title

CONTRACT

THIS CONTRACT, made and entered into, in duplicate, by and between DESCHUTES COUNTY, a political subdivision of the State of Oregon, hereinafter called ″County″ and

_____,
hereinafter called ″Contractor″, for the project entitled:

NEGUS TRANSFER STATON PRE-ENGINEERED METAL BUILDING

WITNESSETH:

THAT the said Contractor, in consideration of the sums to be paid by the County in the manner and at the times herein provided, and in consideration of the other covenants and agreements herein contained, hereby agrees to perform and complete the work herein described and provided for, and to furnish all necessary things in accordance with the applicable contract documents, bound herewith, and in accordance with such alterations or modifications of the same as may be made by the County, and according to and within the meaning and purpose of this contract. This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the Contractor.

THAT the Contract Documents, consisting of Invitation to Bid, Information for Bidders, General Conditions, Bid Proposal, Bid Schedule, Exception to Specifications, and Contract, bound herewith are hereby specifically referred to and by this reference made a part hereof, and shall by such reference have the same force and effect as though all of the same were fully written or inserted herein.

THAT the Contractor shall faithfully complete and perform all of the obligations of this Contract, and in particular, shall promptly, as due, make payment of all just debts, dues, demands and obligations incurred in the performance of said Contract; and shall not permit any lien or claim to be filed or prosecuted against the County, its agents or employees. It is expressly understood that this Contract in all things shall be governed by the laws of the State of Oregon, and the Ordinances of the County.

THAT in consideration of the faithful performance of all of the obligations, general and special, herein set out, and in consideration of the faithful performance of the work as set forth in the Contract Documents in accordance with the directions of the Director of Solid Waste and to his satisfaction, the County agrees to pay to the said Contractor the amount earned, as determined from the quantities of work performed, and taking into consideration any amounts that may be deductible and under the terms of the Contract, and to make such payments in the manner and at the times provided in the applicable provisions, and schedule of contract prices.

IN WITNESS WHEREOF, DESCHUTES COUNTY has caused this agreement to be signed in its name, by its Board of County Commissioners, duly attested by its Recording Secretary; and the said Contractor has caused this Contract to be signed and sealed the same as of the _____ day of _____, 2021.

BOARD OF COUNTY COMMISSIONERS
OF DESCHUTES COUNTY, OREGON

_____
ANTHONY DeBONE, Chair, County Commissioner

_____
PHIL CHANG, Vice-Chair, County Commissioner

_____
PATTI ADAIR, County Commissioner

Attest: _____
Recording Secretary

CONTRACTOR:
By: _____
(Attach Power of Attorney or Corporate Resolution)

Title: _____

Attest: _____
Signature and Title

APPROVED:

_____
CHAD CENTOLA, Interim Director of Solid Waste

APPROVED AS TO FORM:

_____
Legal Counsel

Bond No._____

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called
(Corporation, Partnership, or Individual)

Principal, and _____
(Name of Surety)

hereinafter called Surety, are held and firmly bound unto Deschutes County, hereinafter called OWNER, in the penal sum of _____ dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated the _____ day of _____, 2021, a copy of which is hereto attached and made a part hereof for furnishing the **Negus Transfer Station Pre-Engineered Metal Building.**

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, and conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the **TWO YEAR GUARANTY PERIOD**, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does

hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the WORK or the SPECIFICATIONS.

PROVIDED FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original, this _____day of _____ 2021.

ATTEST:

_____	_____
(Principal) Secretary	Principal
(Seal)	BY: _____
_____	_____
Witness as to Principal	Address
_____	_____
Address	
_____	_____

ATTEST:
(Seal)

	_____
	Agent of Record Telephone
_____	_____
(Surety) Secretary	Surety
_____	BY:_____
Witness as to Surety	Attorney-in-Fact
_____	_____
Address	Address
_____	_____

NOTE: Date of BOND must not be prior to date of Contract.
If CONTRACTOR is partnership, all partners should execute BOND.

DESCHUTES COUNTY SERVICES CONTRACT
Contract No. 2021-___
INSURANCE REQUIREMENTS

Contractor shall at all times maintain in force at Contractor's expense, each insurance noted below. Insurance coverage must apply on a primary or non-contributory basis. All insurance policies, except Professional Liability, shall be written on an occurrence basis and be in effect for the term of this contract. Policies written on a "claims made" basis must be approved and authorized by Deschutes County.

Contractor Name: TBD

Workers Compensation insurance in compliance with ORS 656.017, requiring Contractor and all subcontractors to provide workers' compensation coverage for all subject workers, or provide certification of exempt status. Worker's Compensation Insurance to cover claims made under Worker's Compensation, disability benefit or any other employee benefit laws, including statutory limits in any state of operation with Coverage B Employer's Liability coverage all at the statutory limits. In the absence of statutory limits the limits of said Employers liability coverage shall be not less than $1,000,000 each accident, disease and each employee. This insurance must be endorsed with a waiver of subrogation endorsement, waiving the insured's right of subrogation against County.

Professional Liability insurance with an occurrence combined single limit of not less than:

Per Occurrence limit	Annual Aggregate limit
☒ $1,000,000	☒ $2,000,000
☐ $2,000,000	☐ $3,000,000
☐ $3,000,000	☐ $5,000,000

Professional Liability insurance covers damages caused by error, omission, or negligent acts related to professional services provided under this Contract. The policy must provide extended reporting period coverage, sometimes referred to as "tail coverage" for claims made within two years after the contract work is completed.

☒ Required by County ☐ Not required by County (one box must be checked)

Commercial General Liability insurance with a combined single limit of not less than:

Per Single Claimant and Incident	All Claimants Arising from Single Incident
☒ $1,000,000	☒ $2,000,000
☐ $2,000,000	☐ $3,000,000
☐ $3,000,000	☐ $5,000,000

Commercial General Liability insurance includes coverage for personal injury, bodily injury, advertising injury, property damage, premises, operations, products, completed operations and contractual liability. The insurance coverages provided for herein must be endorsed as primary and non-contributory to any insurance of County, its officers, employees or agents. Each such policy obtained by Contractor shall provide that the insurer shall defend any suit against the named insured and the additional insureds, their officers, agents, or employees, even if such suit is frivolous or fraudulent. Such insurance shall provide County with the right, but not the obligation, to engage its own attorney for the purpose of defending any legal action against County, its officers, agents, or employees, and that Contractor shall indemnify County for costs and expenses, including reasonable attorneys' fees, incurred or arising out of the defense of such action.

The policy shall be endorsed to name ***Deschutes County, its officers, agents, employees and volunteers as an additional insured***. The additional insured endorsement shall not include declarations that reduce any per occurrence or aggregate insurance limit. The contractor shall provide additional coverage based on any outstanding claim(s) made against policy limits to ensure that minimum insurance limits required by the County are maintained. Construction contracts may include aggregate limits that apply on a "per location" or "per project" basis. The additional insurance protection shall extend equal protection to County as to Contractor or subcontractors and shall not be limited to vicarious liability only or any similar limitation. To the extent any aspect of this Paragraph shall be deemed unenforceable, then the additional insurance protection to County shall be narrowed to the maximum amount of protection allowed by law.

☒ Required by County ☐ Not required by County (One box must be checked)

Automobile Liability insurance with a combined single limit of not less than:
Per Occurrence
☐ $500,000
☒ $1,000,000
☐ $2,000,000

Automobile Liability insurance includes coverage for bodily injury and property damage resulting from operation of a motor v
Commercial Automobile Liability Insurance shall provide coverage for *any* motor vehicle (symbol 1 on some insurance certif
driven by or on behalf of Contractor during the course of providing services under this contract. Commercial Automobile L
is required for contractors that own business vehicles registered to the business. Examples include: plumbers, electric
construction contractors. An Example of an acceptable personal automobile policy is a contractor who is a sole propriet
does not own vehicles registered to the business.

☒ Required by County ☐ Not required by County (one box must be checked)

Additional Requirements. Contractor shall pay all deductibles and self-insured retentions. A cross-liability clause or separation of insured's condition must be included in all commercial general liability policies required by this Contract. Contractor's coverage will be primary in the event of loss.

Certificate of Insurance Required. Contractor shall furnish a current Certificate of Insurance to the County with the signed Contract. Contractor shall notify the County in writing at least 30 days in advance of any cancellation, termination, material change, or reduction of limits of the insurance coverage. The Certificate shall also state the deductible or, if applicable, the self-insured retention level. Contractor shall be responsible for any deductible or self-insured retention. If requested, complete copies of insurance policies shall be provided to the County.

Risk Management review Date

Sarah Key July 16, 2021

PROJECT MANUAL OF

CONSTRUCTION DOCUMENTS

NEGUS RECYCLING & TRANSFER FACILITY
Pre-Engineered Metal Building Procurement (PEMB)

Project No: 20.04B

Deschutes County Department of Solid Waste
61050 S.E. 27th St.
Bend, OR 97702

BID SET

VOLUME 1 OF 1
(Divisions 00 - 14)

July 7, 2021

PROJECT MANUAL OF
CONSTRUCTION DOCUMENTS

NEGUS RECYCLING & TRANSFER FACILITY
Pre-Engineered Metal Building Procurement (PEMB)
PROJECT NO. 20.04B

DESCHUTES COUNTY DEPARTMENT OF SOLID WASTE
TIMM SCHIMKE, DIRECTOR OF SOLID WASTE

BLRB ARCHITECTS
SETH ANDERSON, AIA, PRINCIPAL-IN-CHARGE
AMY MCCARTHY-SMITH, PROJECT MANAGER
SARAH FISCHER, PROJECT ARCHITECT

BID SET

VOLUME 1 OF 1
(Divisions 00 - 14)

July 7, 2021

PROJECT MANUAL OF
CONSTRUCTION DOCUMENTS

NEGUS RECYCLING & TRANSFER FACILITY
Pre-Engineered Metal Building Procurement (PEMB)

OWNER

DESCHUTES COUNTY DEPARTMENT OF SOLID WASTE
61050 S.E. 27th St.
Bend, OR 97702
541.317.3163
Timm Schimke, Director of Solid Waste
Timm.schimke@deschutes.org

ARCHITECT

BLRB Architects, P.S.
721 SW Industrial Way, Suite 130
Bend, OR 97702
541.330.6506
Seth Anderson, AIA, Principal-in-Charge - sanderson@blrb.com
Amy McCarthy-Smith, AIA, Project Manager - amccarthysmith@blrb.com
Sarah Fischer, Project Architect - sfischer@blrb.com

ARCHITECT'S CONSULTANTS

STRUCTURAL ENGINEER

ENGINEERING
Address
City ST
Ph.
Contact:
Email:

CIVIL ENGINEER

MECHANICAL ENGINEER

ELECTRICAL ENGINEER

ARCHITECT'S SEAL

The undersigned hereby certifies that the Architectural Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

BLRB Architects

END OF ARCHITECTURAL CERTIFICATION

CIVIL ENGINEER'S SEAL

The undersigned hereby certifies that the Civil Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

Company Name

END OF CIVIL CERTIFICATION

STRUCTURAL ENGINEER'S SEAL

The undersigned hereby certifies that the Structural Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

Company Name

END OF STRUCTURAL CERTIFICATION

MECHANICAL ENGINEER'S SEAL

The undersigned hereby certifies that the Mechanical Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

Company Name

END OF MECHANICAL CERTIFICATION

ELECTRICAL ENGINEER'S SEAL

The undersigned hereby certifies that the Electrical Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

Company Name

END OF ELECTRICAL CERTIFICATION

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SECTION 07 4113 - STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Standing-seam metal roof panels.
2. Cover board.
3. Underlayment materials.

B. Related Sections:
1. Division 07 Section “Roof Accessories” for snow gaurds attached to standing seams.
2. Division 07 Section “Sheet Metal Flashing and Trim.”
3. Division 11 Section "Facility Fall Protection" for roof anchors attached to standing seams.

1.03 REFERENCES

A. Reference Standards:
1. AC 48 Acceptance Criteria for Roof Underlayments for use in severe climate areas.
2. AC 207 Acceptance Criteria for Polypropylene Roof Underlayments.
3. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
4. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
5. ASTM A792: Steel Sheet, 55% Aluminum Zinc Alloy Coated by the Hot Dip Process.
6. ASTM C1371: Determination of Emittance of Materials near Room Temperature Using Portable Emissometers.
7. ASTM C1549: Determination of Solar Reflectance near Ambient Temperature Using a Portable Solar Reflectometer.
8. ASTM D523: Specular Gloss.
9. ASTM D 1682 Standard Test Methods for Breaking Load and Elongation of Textile Fabrics (for roof underlayment).
10. ASTM E 96/E 96M - Test Methods for Water Vapor Transmission of Materials Fabrics (for roof underlayment).
11. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
12. ASTM E1646: Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
13. ASTM E1680: Rate of Air Leakage Through Exterior Metal Roof Panel Systems
14. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.
15. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.
16. ASTM E2140: Weather Penetration of Metal Roof Panel Systems by Static Water Pressure Head.
17. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials ((for roof underlayment).

18. CRRC-1 Method #1: Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer.
19. FM Approvals Standard 4471: Class 1 Panel Roofs.
20. SMACNA Architectural Sheet Metal Manual.
21. UL 580: Standard for Tests for Uplift Resistance of Roof Assemblies
22. US Environmental Protection Agency: Energy Star Reflective Roof Products
23. US Green Building Council (USGBC): Leadership in Energy and Environmental Design (LEED)

1.04 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
1. Product Data: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Product Test Reports: For roofing materials, documentation indicating that roofing materials comply with Solar Reflectance Index requirement.

C. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

D. Samples: For each type of metal panel - 12 inches long by panel width.

1.06 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.07 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.09 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Twenty (5) years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Finish Warranty Period: Twenty (25) years from date of Substantial Completion.

C. Special Weather-tightness Warranty: Installer's standard form in which Installer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
   1. Warranty Period: Two (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General: Design attachment system that will limit fastener penetration to 3/4" into plywood roof deck. Prevent roof system fasteners from penetrating 1" thick marine plywood decking.

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

C. Energy Performance: Provide roof panels that are listed on the EPA/DOE's ENERGY STAR "Roof Product List" for steep-slope roof products.

D. Energy Performance: Provide roof panels with an aged Solar Reflectance Index of not less than 0.64 when tested according to CRRC-1.

E. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

F. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 or ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 0.022 cfm per linear foot of joint at static test pressure differential of 12.00 psf.

G. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 or ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: No leakage through panel joints at 20.00 psf.

H. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
   1. Water Penetration: No leakage through panel side-seams and endlaps after six hours when tested according to ASTM E2140 at a static water pressure head of 6.00 inches.

I. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

J. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing 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 (Range): 120 deg F , ambient; 180 deg F , material surfaces.

2.02 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
   1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels : Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company, SpanSeam Metal Roofing or comparable product by one of the following:
      a. Architectural Metal Systems.
      b. Fabral.
      c. Firestone Metal Products, LLC.
      d. MBCI; a division of NCI Building Systems, L.P.
      e. Morin; a Kingspan Group company.
      f. Taylor Metal Products.
      g. AMS, Architectural Metal Solutions
      h. Nu-Ray Metals
   2. Metallic-Coated Steel Sheet: 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. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Nominal Thickness: 0.034 inch (22 gage).
      b. Exterior Finish: Two-coat fluoropolymer.
      c. Color: As selected by Architect from Manufacturer's full range.
   3. Clips: Two-piece floating to accommodate thermal movement.
      a. Material: 0.034 inch (22 gage), zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
   4. Joint Type: Double folded.
   5. Panel Coverage: 16 inches.
   6. Panel Type: Striated
   7. Panel Height: 2.0 inches.

2.03 VAPOR RETARDER

A. Roof Vapor Retarder:
   1. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft., with maximum permeance rating of 0.0507 perm.
      a. Thickness: 6 mils.
   2. Products:
      a. Raven Industries Inc.; DURA-SKRIM 6WW.
      b. Reef Industries, Inc.; Griffolyn T-65.
      c. Or approved.

2.04 COVER BOARD

A. Glass-Mat Gypsum Roof Sheathing: Fiberglass-mat faced gypsum roof board, ASTM C 1177/1177M.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide GP Gypsum, DensDeck Prime Roof Boards or comparable product:
      a. "USG Securock Glass mat roof board" by United States Gypsum Company (USG).
      b. or approved.
   2. Thickness: 1/2 inch.
      a. Weight: 2.0 lb/sq. ft.
      b. Flute Span (ASTM E661): 5 inches.

2.05 UNDERLAYMENT MATERIALS

A. Roof Sheet Underlayment: Self-adhered water-resistive vapor permeable roof underlayment sheet with integrated tape to serve as a secondary rain barrier under sloped roofing systems.
   1. Water Vapor Permeance: Tested to ASTM E 96 Method B: 59 perms (3392ng/Pa.s.m2).
   2. Water Resistance tested (Ponding): AC 48, Pass, no leakage.
   3. Tensile Strength tested to ASTM D 1682: Pass.
   4. Liquid Water Transmission to ASTM D4869: Pass.
   5. Fire Resistance: Class A Fire Rated.
   6. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
   7. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970..
   8. For self-adhered systems, provide primer when recommended by underlayment manufacturer.
   9. Basis-of-Design Product: Subject to compliance with requirements, provide VaproShield, SlopeShield or comparable product by one of the following:
      a. Cosella-Dorken, DELTA-TRELA.
      b. Carlisle Construction Materials.
      c. Grace Construction Products, a unit of W. R. Grace & Co.
      d. Henry Company.
   10. Provide underlayment materials that are compatible with both PVC and Metal roofing systems where they intersect.

B. Water-Resistive Flashing Membrane and Tape: Manufacturer's recommended Self-adhered underlayment flashing membrane and tape.

C. Penetration Sealant: Manufacturer's recommended water-resistive air barrier sealant compatible with sheet membrane.

D. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.06 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
1. Color: Metal Fascia Color; Match AEP Span, metal roofing color or as selected by architect to match adjacent materials.

D. Gutters and Downspouts: Formed from same material as roof panels according to SMACNA's "Architectural Sheet Metal Manual" and Section 07 62 00 "Sheet Metal flashing and Trim." Finish to match roof fascia and rake trim.

E. Panel Fasteners: Self-tapping screws designed to withstand design loads.

F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch (thick.
2. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.07 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.08 FINISHES

A. Panels and Accessories:
1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.
2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.01 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.02 VAPOR-RETARDER INSTALLATION

A. Apply vapor barrier to top of decking material under flat insulation boards in accordance with manufacturer’s instructions.

B. Self-adhering vapor barrier to be applied in strict accordance to Manufacturer’s written instructions.

C. Barrier is designed to dimensionally span metal decking flutes, therefore the layout of the vapor barrier must be started properly.

D. Overlap joints a minimum of 3-inches and roll seams.

E. End seams: install metal plate to support end seams across decking.

F. Shingle vapor barrier to weather to create a weather resistant surface.

G. Allow inspection prior to cover.

H. Tears/Punctures: Repair tears or punctures in vapor retarder immediately before concealment by application of gypsum board or other construction with approved taping materials. Cover with approved 2-1/2 inch wide self-adhesive vapor barrier tape for an airtight seal.

I. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

J. At the end of each work day, seal vapor retarder water-tight to protect installed work.

3.03 UNDERLAYMENT INSTALLATION

A. Self-Adhering High-Temperature Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches . Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
1. Apply over the entire roof surface.

B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.04 METAL PANEL INSTALLATION

A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.

1. Install clips to supports with manufacturer approved fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Watertight Installation:
    a. Factory applied continuous ribbon of sealant to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
    1. See Division 07 Section, “Sheet Metal Flashing and Trim”.

3.05 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 07 4113

SECTION 07 4213 - METAL WALL PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Metal wall panels.
   2. Metal soffit panels.

B. Related Sections:
   1. Division 07 Section “Self-Adhering Vapor-Permeable Air-Barrier Membrane” for transition and flashing components of building air/moisture barrier.
   2. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal copings, flashings, reglets and roof drainage items.
   3. Division 07 Section "Joint Sealants" for field-applied joint sealants.

1.03 REFERENCE STANDARDS

A. American Architectural Manufacturer's Association (AAMA):
   1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized and Zinc-Aluminum Coated Steel Substrates.
   2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. American Society of Civil Engineers (ASCE):
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM):
   1. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate.
   2. ASTM B 221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   3. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Tests.
   4. ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
   5. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

1.04 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review air and water barrier installation, flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal panel assembly during and after installation.
8. Review of procedures for repair of metal panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.05 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for specified products.

B. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized dealer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale 3-inch per foot of all required trim and extrusions needed for a complete installation
   1. Include data indicating compliance with performance requirements.
   2. Indicate points of supporting structure that must coordinate with modular metal panel system installation.

C. Samples for Initial Selection: For each product specified including sealants and gaskets. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 24-inch (600 mm) section of wall panel showing, horizontal joinery, vertical joint return, panel stiffener and anchoring details. Provide 12-inch long pieces of each extruded aluminum trim.

1.06 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.

B. Qualification Information: For Installer and Installer's field supervisor.

C. Manufacturer's warranty: Submit sample warranty.

1.07 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10 years' experience in manufacture of similar products in successful use in similar applications.
   1. Refer to Division 01 Section "Product Requirements" for procedures for requesting substitutions following award of Contract.

2. Approval of Substitutions After Award: In addition to requirements specified in Division 01, include the following for proposed substitutions, within time allowed for substitution review:
    a. Product data, including certified independent test data indicating compliance with requirements.
    b. Samples of each component.
    c. Sample submittal from similar project.
    d. Project References: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
    e. Sample warranty.

B. Wall Systems Installer Qualifications: Experienced Installer with minimum of 5 years' experience with successfully completed projects of a similar nature and scope.

C. Mockups: Build mockup in size and location indicated. Show details of modular metal panel system. Demonstrate methods and details of installation. Show details of vertical joints, penetrations, doors, windows, louvers, pipe openings, inside and outside corners, top and bottom of wall, horizontal and vertical joints.
1. Approval of mockup does not relieve Contractor of responsibility to comply with all requirements of contract documents.
2. Approved mockup may become part of installation if approved by Architect.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect products of modular metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.
1. Deliver, unload, store, and erect modular metal wall panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members, adjoining construction and wall openings dimensions by field measurement before panel fabrication and indicate measurements on final shop drawings.

1.11 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal wall panel assemblies that fail in materials and workmanship within two years from date of Substantial Completion.

B. Special Panel Finish Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace wall panels that display evidence of deterioration of finish within 40 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing 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 (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.02 SYSTEM DESCRIPTION

A. Modular metal wall panel system consisting of metal panels in a rainscreen application as part of the assembly described below:
   1. Modular Metal Wall Panels over Outside-Insulated Framed Wall System: Modular metal panels applied as exterior rainscreen cladding over wall framing specified in Division 05 Section "Cold-Formed Metal Framing" with exterior sheathing specified in Division 06 Section "Sheathing," an applied membrane that provides air, moisture, and water vapor control specified in Division 07 Section "Fluid Applied Water Membrane Air Barrier," and insulation within the framing and applied outboard of the sheathing specified in Division 07 Section "Thermal Insulation." Metal wall panel installation specified in this Section includes mounting metal angle framing for panel attachment as indicated on Drawings.

2.03 METAL WALL PANELS

A. Basis-of-Design Product - MP1: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company; Nu-Wave Corrugated Metal Panel, or a comparable product by one of the following:
   1. CENTRIA Architectural Systems.
   2. Morin - A Kingspan Group Company.
   3. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
   4. Talylor Metal Products.

B. Basis-of-Design Product - MP2: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company; Flush Panel Metal Wall Panels, or a comparable product by one of the following:
   1. CENTRIA Architectural Systems.
   2. Morin - A Kingspan Group Company.
   3. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
   4. Talylor Metal Products.

2.04 METAL SOFFIT PANELS

A. Basis-of-Design Product: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company; Flush Panel Metal Wall Panels, or a comparable product by one of the following:

1. CENTRIA Architectural Systems.
2. Morin - A Kingspan Group Company.
3. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
4. Talylor Metal Products.

2.05 MATERIALS

A. Metallic-Coated Steel Sheet: 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. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   1. Nominal Thickness: 0.034 inch.
   2. Exterior Finish: Dura Tech 5000 (PVDF) polyvinylidene difluoride by AEP Span or comparable 3-coat fluoropolymer resin coating system.
   3. Color: As selected by Architect from manufacturer's full range.

2.06 ACCESSORIES

A. Provide manufacturer's factory-formed clips, shims, flashings, sealants, and tapes for a complete installation.

2.07 FABRICATION

A. General: Fabricate modular metal panels and accessories at factory identical to tested units using manufacturer's standard procedures and processes necessary to meet performance requirements.
   1. Provide components of modular metal panel system that are products of one manufacturer, including modular metal panels, head and sill trim, bottom weep, starter flashing, and metal copings.

B. Modular Metal Panels: Fabricate modular metal panels requiring no further fabrication or modification in field.
   1. Horizontal Joints: Dry seal, drained and back ventilated.
   2. Vertical Joints: Pre-formed returns.
   3. Reveals: 3/4 inch, unless otherwise indicated.
   4. System Depth: As indicated on Drawings.

2.08 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:
   1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

D. Exposed Trim, Flashings and Fastener Finish: Match panel finish.
1. Thickness: 0.060 inch nominal.
2. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for additional requirements.

E. Colors: Provide the following as indicated on Drawings from AEP Span Eternal Collection:
1. MP1: Urban Slate.
2. MP2: Sungold.
3. MP3: Rainforest.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine modular metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of modular metal panel system.
1. Inspect framing that will support modular metal panel system to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to modular metal wall panel system manufacturer.
a. Maximum deviations acceptable to modular metal panel system manufacturer:
1) 1/4-inch in 20 feet vertically or horizontally from face plane of framing.
2) 1/2-inch maximum deviation from flat substrate on any building elevation.
3) 1/8-inch in 5 feet.
2. Confirm presence of acceptable framing members to match installation requirements of modular metal panel system.
a. Confirm framing minimum 0.048 inch (18 gauge) at maximum 24 inch spacing.
3. Verify that window, door, louver and other penetrations match layout on shop drawings.

B. Notify Contractor in writing of out-of-tolerance work and other deficient conditions prior to proceeding with modular metal wall panel system installation.

3.02 MODULAR METAL PANEL SYSTEM INSTALLATION

A. General: Install modular metal panel system in accordance with approved shop drawings and manufacturer's recommendations.

B. Installation: Attach panels to metal sub-framing using recommended clips, screws, fasteners, sealants, and adhesives indicated on approved shop drawings.
1. Thermal spacers shall be attached to the structure, metal wall studs, as required to transmit design loads.
2. Horizontal Joinery: Working from base of installation to top, connect upper panel to lower panel at joinery.
3. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings.
4. Galvanic Action: Where elements of modular metal wall system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Framing and other components shall be straight to match plane of panel as required to meet the installed panel tolerances with straight, sharply formed edges.

D. Rainscreen Installation: Proceed with installation of manufacturer's dry seal horizontal joinery. Keep open spaces in horizontal joinery intended to ventilate cavity behind system.

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a service representative authorized by metal wall panel manufacturer to inspect completed installation. Submit written report. Correct deficiencies noted in report.

3.04 CLEANING AND PROTECTION

A. Remove temporary protective films within 2 weeks of erection. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt, and sealant. Maintain in a clean condition during construction.

B. Replace damaged panels and accessories that cannot be repaired by field repair.

END OF SECTION 07 4213

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SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Manufactured Products:
      a. Manufactured through-wall flashing and counterflashing.
      b. Manufactured reglets and counterflashing.
   2. Formed Products:
      a. Formed roof drainage sheet metal fabrications.
      b. Formed low-slope roof sheet metal fabrications.
      c. Formed wall sheet metal fabrications.
      d. Formed equipment support flashing.
   3. Plastic Assemblies and Components:
      a. Downspouts.

B. Related Sections:
   1. Division 07 Section "Standing Seam Metal Roof Panels" for metal flashing and trim integral with metal roof panels.
   2. Division 07 Section "Metal Wall Panels" for sheet metal flashing and trim integral with metal wall and soffit panels.
   3. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled works. Details and drawings are to be drafted using CAD drafting. Include the following:
   1. Identification of material, thickness, weight, and finish for each item and location in Project.
   2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
   3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   4. Details of termination points and assemblies, including fixed points.
   5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
   6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
   7. Details of special conditions.

8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Accessories and Miscellaneous Materials: Full-size Sample.
4. Aluminum Samples: Samples to show full range to be expected for each color required.

E. Qualification Data: For qualified fabricator.

F. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

G. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that 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.

B. Sheet Metal flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
1. NRCA - Latest Edition of the NRCA Roofing and Waterproofing Manual.

C. Mockups: Build Integrated Exterior Mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build exterior mockup of typical roof edge, including built-in gutter, approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.06 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which 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 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.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated 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. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in:
   1. Refer to Structural General Notes for Wind Up-Lift tables.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.02 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
   1. Surface: Smooth, flat.
   2. Exposed Coil-Coated Finishes:
      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.

3. Color: Match Architect's samples; where adjacent to metal panel, match color of metal panel.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.
1. Finish: 2B (bright, cold rolled) and 4 (polished directional satin) as selected by Architect.
2. Surface: Smooth, flat.

D. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
2. Surface: Smooth, flat.
3. Exposed Coil-Coated Finish:
   a. Two-Coat Fluoropolymer: AAMA 621. 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.
4. Color: Match Architect's samples**;** where adjacent to metal panel, match color of metal panel.
5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.03 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Products: Subject to compliance with requirements, provide one of the following:
   a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
   b. GCP Applied Technologies (formerly W. R. Grace); Ultra.
   c. Henry Company; Blueskin PE200 HT.

2.04 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: 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 or manufactured item.
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.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
4. Fasteners for Zinc-Tin Alloy-Coated Stainless-Steel Sheet: Series 300 stainless steel.
5. Fasteners for Zinc-Coated (Galvanized): Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

C. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.
2. For Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.05 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Fry Reglet Corporation.
b. Heckmann Building Products Inc.
c. Hickman, W. P. Company.
d. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
e. Sandell Manufacturing Company, Inc.
2. Material: Stainless steel, 0.019 inch thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
6. Accessories:

a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

7. Finish: Mill.

2.06 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
1. 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.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: 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 as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

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 SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams: 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.

I. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

2.07 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Fabricated Gutters:
1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required and indicated.

2. Materials;
   a. Pre-finished ANSI/ASTM A653 Galvanized sheet steel, minimum 0.034 inch (22 gauge).
3. Size: As indicated on Drawings
4. SMACNA Style: ~~A~~s indicated on Drawings.
5. Finish:
   a. Exterior Finish: Polyvinylidene fluoride (PVDF) minimum 70% Kynar resin, dry film thickness 0.8 mils minimum.
   b. Exterior primer: Baked on epoxy primer coat, dry film thickness 0.2 mils minimum.
   c. Color: Custom color to match Architects' sample.
   d. Interior finish: Factory standard prime-coat, dry film thickness 0.5 mils minimum.
6. Expansion Joints: Built in.
7. Accessories:
   a. Wire ball downspout strainer.
   b. Anchorage Devices: Type as recommended by manufacturer.
   c. Expansion Joints: Provide manufacturer's standard expansion joint assemblies allowing for minimum 3/4 inch thermal movement. Spacing per manufacturer.
   d. Gutter Brackets: Fabricate from 0.14 inch (10 gauge) steel, galvanize and finish to match color of gutter. Multiple shapes required.
   e. Top Gutter brackets: Fabricate 2 inch wide, from 0.060 inch (16 gauge) steel, galvanize and finish to match color of gutter. Space at no greater than 18 inches o.c.

B. Downspouts: Fabricate sheet metal downspouts complete with elbows. Furnish with metal hangers, from same material as downspouts, and anchors. For cast iron downspouts, refer to Drawings and Division 05 Section "Metal Fabrications."
1. For rectangular downspouts, see material tag MDS-1.
2. For round downspouts, see material tag MDS-2.
3. Fabricate from the following materials:
   a. Galvanized Steel: 0.022 inch thick.

C. Splash Pans:
1. SMACNA Type: Fig 1-36.
2. Fabricate from the following materials:
   a. Zinc-Tin Alloy-Coated Stainless Steel: 0.018 inch thick.
   b. 20-gauge galvanized steel.

2.08 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12-foot- long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch high, end dams where flashing is discontinuous. Fabricate from the following materials:
1. Stainless Steel: 0.016 inch thick.
2. Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 6-inches beyond wall openings. Form head and sill flashing with 2-inch high, end dams. Fabricate from the following materials:
1. Zinc Galvanized Steel: 0.022 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

C. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

D. Kick-Out Flashing: Formed to RH and LH sides; fabricated to divert water into gutter system at wall and end of gutter.
1. Stainless Steel: 0.0312 thick; soldered fabrication.

E. Saddle Flashing: Fabricate with profile shown on drawings.
1. Joint Style: Seamed and soldered.
2. Sheet Metal: Stainless steel, 0.029-inch thick.

2.09 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

B. Overhead-Piping Safety Pans: Fabricate from the following materials: Soldered fabrication
1. Zinc-Tin Alloy-Coated Stainless Steel: 0.024 inch thick.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.02 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.03 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods,

protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Pre-tinning is not required for zinc-tin alloy-coated stainless steel.
3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

G. Rivets: Rivet joints in matching colored metal where indicated and where necessary for strength.

3.04 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts. Provide top brackets for gutters spaced not more 36 inches apart.
1. Fasten gutter spacers to front and back of gutter.
2. Loosely lock straps to front gutter bead and anchor to roof deck.
3. Anchor and loosely lock back edge of gutter to continuous cleat flashing.
4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
2. Provide wire ball strainer at each downspout location.
3. Provide elbows at base of downspout to direct water away from building.
4. Connect downspouts to underground drainage system indicated.

D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in elastomeric sealant compatible with roofing membrane.

E. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.05 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at16-inch centers.
1. Coordinate flashing required to be fabricated of coated metal used to heat weld flashing to PVC membrane. Coordinate with Division 07 Sections.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.
1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
2. Anchor interior leg of coping with neoprene washers and screw fasteners through slotted holes at 24-inch centers.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch centers.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

3.06 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section "Unit Masonry."

C. Reglets: Installation of reglets is specified in Division 03 Section "Cast-in-Place Concrete" and Division 04 Section "Unit Masonry."

D. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

E. Rubberized flexible flashing at Louvers: Install rubberized flexible flashings in louver opening and into plenum sheet metal of mechanical duct. Install inside duct floor of plenum (3'-0" back and 3" up sides) and up sides to provide drainage plane for wind-driven rain to drain back out of sheet metal enclosure.

3.07 MISCELLANEOUS FLASHING INSTALLATION

A. Overhead-Piping Safety Pans: Suspend pans independent from structure above as indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.08 ERECTION 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 as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.09 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. 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.

END OF SECTION 07 6200

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:
1. Roof hatches.
2. Roof vents
3. Preformed flashings.
4. Snow guards.

B. Related Sections:
1. Division 05 Section "Metal Fabrications" for metal vertical ladders and access to roof hatches.
2. Division 07 Section "Standing Seam Metal Roof Panels."
3. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
4. Division 08 Section "Unit Skylights" for small individual skylights.

1.03 SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
1. Snow Guards: Submit design calculations for loadings and spacings based on manufacturer testing.

C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

D. Samples: For each type of exposed factory-applied color finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.

E. Warranty: Special warranty specified in this Section.

1.04 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

B. Pre-installation Conference: Conduct conference at Project site.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.07 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing materials and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
   1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes and roof expansion joints.

1.08 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer 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.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers listed in other Part 2 articles.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.

2.02 METAL MATERIALS

A. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated and mill phosphatized for field painting.

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 coated.

C. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.
   1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated.
   2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coated.
   3. Exposed Finishes: High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
      a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2605, except as modified below:
         1) Humidity Resistance: 2000 hours.
         2) Salt-Spray Resistance: 2000 hours.

D. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for type of use and mill finish. Coil-coat finish as follows:
   1. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Conversion coating; Organic Coating: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturer's written instructions.
      a. Color and Gloss: As selected by Architect from manufacturer's full range.
   2. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard baked-polymer thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.
      a. Color and Gloss: As selected by Architect from manufacturer's full range.

E. Aluminum Extrusions and Tubes: ASTM B 221, alloy and temper recommended by manufacturer for type of use, mill finished.

F. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304 or Type 316, No. 2D finish.

G. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.

H. Steel Tube: ASTM A 500, round tube, baked-enamel finished.

I. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.

J. Galvanized Steel Pipe: ASTM A 53/A 53M.

2.03 MISCELLANEOUS MATERIALS

A. Polyisocyanurate Board Insulation: ASTM C 1289, 1 inch thick.

B. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.

C. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

D. Polyethylene Sheet: 6-mil- thick, polyethylene sheet complying with ASTM D 4397.

E. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
1. Slip Sheet: Rosin-sized paper, minimum 6 lb/100 sq. ft..

F. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

H. Elastomeric Sealant: ASTM C 920, polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

I. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.

J. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.04 ROOF HATCHES

A. Roof Hatches: Metal roof-hatch units with lids and single-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom. Roof hatch not required to be insulated.
1. Available Manufacturers:
a. Babcock-Davis; a Cierra Products Inc. Company.
b. Bilco Company (The).
c. Custom Curb, Inc.
d. Dur-Red Products.
e. J. L. Industries, Inc.
f. Milcor Inc.; a Gibraltar Company.
g. Nystrom, Inc.
h. O'Keeffe's Inc.
i. Precision Ladders, LLC.
j. Roof Products & Systems Corporation.
k. Wasco Products, Inc.

B. Type and Size: Single-leaf lid, 30 by 36 inches, or as otherwise indicated on Drawings.

C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.

D. Hatch Material: Zinc-coated (galvanized) steel sheet.
   1. Thickness: Manufacturer's standard thickness for hatch size indicated.
   2. Finish: Two-coat fluoropolymer.
      a. Color: As selected by Architect from manufacturer's full range.

E. Construction:
   1. Hatch Lid: Opaque, with manufacturer's standard metal liner of same material and finish as outer metal lid.
   2. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
   3. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.

F. Hardware: Stainless-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
   1. Provide 2-point latch on covers larger than 84 inches.
   2. Provide remote-control operation.

G. Ladder Safety Post: Manufacturer's standard ladder safety post. Post to lock in place on full extension. Provide release mechanism to return post to closed position.
   1. Test Load: 500 lbs.
   2. Height: 42 inches above finished roof deck.
   3. Material and Finish: Stainless steel, mill finished.
   4. Diameter: Pipe with 1-5/8-inch OD tube.

2.05 PREFORMED FLASHINGS

A. Exhaust Vent Flashings: Double-wall metal flashing sleeve, urethane insulation filled, with integral deck flange, 12 inches high, with removable metal hood and metal collar, and as follows:
   1. Available Manufacturers:
      a. Thaler Metal Industries Ltd.
   2. Metal: Aluminum sheet, 0.064 inch thick, mill finished.
   3. Diameter: As indicated.

B. Vent Stack Flashing: Metal flashing sleeve, with integral deck flange, uninsulated, and as follows:
   1. Available Manufacturers:
      a. Thaler Metal Industries Ltd.
   2. Metal: Aluminum sheet, 0.064 inch thick, mill finished.
   3. Height: 13 inches.
   4. Diameter: As indicated.

2.06 SNOW GUARDS

A. Unit Snow Guards: Individual projecting metal shapes, attached to standing seams of roof panel, and seam clamped or glue-applied in field.
   1. Projecting Metal Shapes: Zinc plated steel, triangular spike design.
   2. Placement: As recommended by manufacturer.
   3. Manufacturers:
      a. Berger Building Products: www.bergerbp.com/#sle.
      b. Rocky Mountain Snow Guards, Inc; ST9 Snow Guard: www.rockymountainsnowguards.com/#sle.

c. TRA Snow and Sun: www.trasnowandsun.com/#sle.
d. Substitutions: See Division 01 Section "Substitutions."
e. Color: To match roof panel. See Division 07 Section "Standing Seam Metal Roof Panels."

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
1. Verify that substrate is sound, dry, smooth, and clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
2. Verify dimensions of roof openings for roof accessories.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Install roof accessories to fit substrates and to result in watertight performance.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of [uncoated aluminum] [stainless-steel] roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

E. Roof Hatch Installation:
1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
2. Attach ladder safety post according to manufacturer's written instructions.

F. Preformed Flashing Installation:
1. Secure to roof membrane according to vent and stack flashing manufacturer's written instructions.

G. Seal joints with elastomeric or butyl sealant as required by manufacturer of roof accessories.

H. Snow Guard Installation:
1. Install snow guards according to manufacturer's written instructions.
a. Space rows as indicated on Shop Drawings.

b. Space rows as recommended by manufacturer

2. Attachment for Standing-Seam Metal Roofing:
   a. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
   b. Pad-Type, Flat-Mounted Snow Guards:
      1) Mechanically attach or Adhere to metal roofing according to manufacturer's instructions.
      2) Solder to copper roofing according to manufacturer's instructions.
      3) Pad-Type, Seam-Mounted Snow Guards:
      4) Install snow guards in straight rows.
      5) Secure in place using stainless steel set screws, incorporating round nonpenetrating point.
   c. Torque set screw according to manufacturer's instructions.
      1) Rail-Type, Seam-Mounted Snow Guards:
      2) Install brackets to vertical ribs in straight rows.
   d. Secure with stainless steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
   e. Torque set screw according to manufacturer's instructions.
      1) Install cross members to brackets.

3.03 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.04 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 7200

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SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Standard hollow metal doors and frames.
2. Steel sidelight, borrowed lite, and transom frames.
3. Factory finishing hollow metal doors and frames and factory machining for hardware.
4. Louvers installed in hollow metal doors.
5. Light frames and glazing installed in hollow metal doors.

B. Related Sections:
1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 07 Section "Thermal Insulation" for spray-in-foam or mineral-fiber insulation in hollow metal frames.
3. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
4. Division 08 Section "Glazing" for door and hollow metal framed glazing.
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
6. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.03 REFERENCES

A. ANSI (American National Standards Institute):
1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ANSI/SDI A250.13 - Testing and Rating of Sever Windstorm Resistant Components for Swing Door Assemblies.
7. ANSI/NAMM/HMMA 867-06 - Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames.
8. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
9. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
10. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
11. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

B. ASTM (American Society for Testing and Materials):

1. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
4. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
6. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
7. ASTM E 413 - Classification for Rating Sound Insulation.
8. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.

C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

D. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

1.04 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating,, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Other Action Submittals:
1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

D. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40” above sill) or UL 10C.
   1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
   2. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
      a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.

E. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
   1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
      a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.35, R-Value 2.9, including insulated door, thermal-break frame and threshold.
   2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
      a. Rate of leakage of the door assembly shall not exceed 0.30 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

F. Sound Transmission Class (STC) Rated Doors: Provide sound transmission class rated doors fabricated as sound-reducing types with testing according to ASTM E 90, and classifications according to ASTM E 413. Submit manufacturer’s written results of STC ratings from testing performed by a qualified independent testing agency for sound resistant doors.

G. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
   1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
   1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.09 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Amweld Building Products, LLC.
   2. Ceco Door Products; an Assa Abloy Group company.
   3. Curries Company; an Assa Abloy Group company.
   4. Republic Steel Products
   5. Steelcraft; an Ingersoll-Rand company.
   6. Stiles Hollow Metal

B. Fire-Resistive Door Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. SAFTIFIRST, Safety and Fire Technology, Inc., a division of O'Keefe's Inc. (888-653-3333).

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Zcoating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M. Cement grout for all steel frames (door and relite) in concrete and masonry walls (see Division 04 Section "Unit Masonry"). Do not grout mullions or frames that are fully enclosed.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
   1. Provide insulated door assembly with a minimum of .36 U.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities. Do not apply to fire-rated frames.

K. Dissimilar Metals: provide isolation protection of dissimilar metals.

2.03 STANDARD HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Design: Flush panel.
   2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral core, or vertical steel-stiffener core.
      a. Polystyrene and Polyurethane (Insulated) Doors: Where indicated, provide doors fabricated as thermal-rated assemblies.
         1) Thermal-rated assemblies shall have a minimum R-value 11 or better.
      b. Standard Vertical Steel-Stiffener Core: Minimum 22 gauge steel-stiffeners at 6 inches on-center construction attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners filled with fiberglass insulation (minimum density 0.8#/cubic ft.).
      c. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
   3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.0598-inch) thick steel, Model 2 (Fully welded, seamless face and edges).

4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
8. Basis of Design:
    a. CECO Door Products (C) - Steel-Stiffener: Medallion Series.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
3. Level/Model: Level 3 and Physical Performance Level B (Heavy Duty), Minimum 0.042-inch thick steel, Model 2 (Fully welded, seamless face and edges).
4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Edge, 1/8 inch in 2 inches.
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 3/16 inch plate, 1-1/4 by 9 inches or minimum 0.067 continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
8. Basis of Design:
    a. CECO Door Products (C) - Temperature Rise: Medallion 450 Series.

2.04 ENERGY EFFICIENT HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design specified, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.

a. Provide 0.0299 inch thick steel stiffeners at 6 inches on-center internally welded at 5 inches on center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
b. Thermal properties to rate at a minimum R Factor of 11.01, per ASTM C518.

3. Level/Model: Level 2 and Physical Performance Level A (Extra Heavy Duty), Minimum 0.042 inch thick steel, Model 2 (Fully welded, seamless face and edges).
4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Edge, 1/8 inch in 2 inches.
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 3/16 inch thick plate, 1-1/4 by 9 inches.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
8. Basis of Design:
   a. CECO Door Products (C) - Trio-E Series.

2.05 SOUND RESISTANT DOORS

A. Subject to the same compliance standards and requirements as standard hollow metal doors, provide manufacturer's standard sound resistant acoustic core tested in accordance with ASTM E 90, ASTM E 413, and ASTM E 1332 standards. Fabricate with minimum 16 gauge construction, 1-3/4 inch thickness, combined with standard flush frames designed for mid-range and high range sound attenuation from STC 39 through STC 52 applications. Furnish complete with perimeter sound seals, bottom seals, and threshold as required for specified STC rating.
   1. Basis of Design:
      a. CECO Door Products (C) - Sound-Tech Series.

2.06 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Masonry Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
   1. Fabricate frames with mitered or coped corners.
   2. Fabricate frames, with the exception of knock down types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
   3. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 0.067-inch thick steel sheet.
   4. Basis of Design:
      a. CECO Door Products (C) - SQ/SU and SR Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
   1. Fabricate frames with mitered or coped corners.
   2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
   3. Frames for Level 2 Steel Doors: Minimum 0.053-inch thick steel sheet.
   4. Frames for Wood Doors: Minimum 0.053-inch thick steel sheet.
   5. Frames for Borrowed Lights: Minimum 0.053-inch thick steel sheet.

6. Basis of Design:
   a. Masonry: CECO Door Products (C) - SQ/SU and SR Series.
   b. Drywall: CECO Door Products (C) - DU/DQ, DC, and DC Series.
7. Fire Rated Frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
8. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.07 ENERGY EFFICIENT HOLLOW METAL FRAMES

A. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames, provide where indicated thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate from minimum 16 gauge galvannealed steel, with positive 3/8" vinyl thermal break and integral vinyl weatherstripping. Thermal break frames available as knock down types only.
   1. Basis of Design:
      a. CECO Door Products - Thermal Break SQT and SRT Series.

B. Weatherstripped Frames: Subject to the same compliance standards and requirements as standard hollow metal frames, provide where indicated weatherstripped profiles with 1/8" integral kerf formed into the frame soffit able to receive manufacturer's listed gasket material. Available for use in both masonry and drywall construction, with fire rating up to 3 hours complying with NFPA 105, UL 1784, and ASTM E-283 Test criteria.
   1. Basis of Design:
      a. CECO Door Products - Weatherstripped SQW and SRW Series.

2.08 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
   3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.09 HOLLOW METAL PANELS

A. Provide hollow metal panels 1 inch thick of same materials, construction, and finish as specified for adjoining hollow metal work.

2.10 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

C. Provide louvers for doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch thick, cold-rolled hot dip galvanized steel sheet set into 0.032-inch thick steel frame by Anemostat Door Products, or approved.
1. Interior: Inverted Zee blade type.
2. Exterior: Zee blade type.

2.11 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricators shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 18 gauge (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.12 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.13 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where

practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861 (Custom).

C. Hollow Metal Doors:
   1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
   2. Glazed Lites: Factory cut openings in doors.
   3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.
   4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware."
   5. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
   2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
   4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
   5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
   6. Provide countersunk, flat Phillips head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   7. Mortar Guards: Weld guard boxes to frame at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
   8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware."
   9. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
      a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
      b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.

c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.

10. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
11. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
12. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated on final Shop Drawings, or if not indicated, according to ANSI/NAAMM-HMMA 861.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.14 STEEL FINISHES

A. Preparation: Clean, treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.

B. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
2. Primer for Fire Rated Doors: Tnemec Polyamide epoxy- Series 66 at 4 mils DFT at all fire-rated interior frame surfaces. Provide primer in different color then primer specified above. Do not apply asphaltic emulsion on fire rated doors.
3. Apply asphaltic emulsion only on door frames to receive grout fill in masonry walls.

2.15 PAINT COLOR AND GLOSS:

A. As selected by Architect from manufacturer's full range. See Division 09 Sections "Exterior Painting" and "Interior Painting".

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.02 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with HMMA 840.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. At fire-protection-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable glazing stops located on secure side of opening.
   d. Install door silencers in frames before grouting.
   e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   g. Field apply bituminous coating to backs of frames that are filled with grout. Apply approximately 1/8 inch thick over shop primer and allow to thoroughly dry before handling or installation. Do not apply to fire-rated doors assemblies, use primer product specified in Part 2 “Steel Finishes” subparagraph above in lieu of asphaltic emulsion.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly fill frame with Spray foam insulation, Specified in Division 07 Section “Thermal Insulation,” behind frames.
4. Solidly pack mineral-fiber insulation inside frames.
5. Grouted Frames: Verify prior to proceeding with grouting if frames have not been treated with asphaltic emulsion in accordance with “Field apply bituminous…” subparagraph above under “Hollow Metal Frames” paragraph or at fire-rated door frames treatment with fire-rated epoxy primer.
6. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
7. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
8. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

9. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
10. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
11. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus or minus 1/32 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/32 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/32 inch measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/32 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 1/4 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 1/2 inch.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 1113

SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Service doors.

B. Related Sections:
   1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.
   2. Division 08 Section “Door Hardware” for product requirements for cylinder core and keys.
   3. Division 13 Section "Metal Building Systems” for installation in pre-engineered metal buildings.
   4. Division 26 Sections for electrical service and connections for motor operators, controls, and limit switches; and for system disconnect switches.

1.03 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
   1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
   1. Curtain slats.
   2. Bottom bar with sensor edge.
   3. Guides.
   4. Brackets.
   5. Hood.
   6. Locking device(s).
   7. Include similar Samples of accessories involving color selection.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For overhead coiling doors, accessories, and components, from manufacturer.

C. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

D. Sample Warranty: For special warranty.

1.05 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
   1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.07 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Maintenance: Submit for owner’s consideration and acceptance of a maintenance service agreement for installed products.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors, fire-rated service door and coiling counter door from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling-door manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.

B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
   2. Seismic Component Importance Factor: 1.25.

D. Performance Requirements Submittal: For overhead coiling doors indicated to comply with performance requirements and design criteria, include structural analysis data.
   1. Detail fabrication and assembly of seismic restraints.
   2. Summary of forces and loads on walls and jambs.

2.03 OVERHEAD COILING DOORS

A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Cookson Company.
      b. Cornell Iron Works, Inc.
      c. McKeon Rolling Steel Door Company, Inc.
      d. Overhead Door Corporation.
      e. Wayne Dalton.

B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

C. Door Curtain Slats: Flat faced, 1-1/2 inch slats center-to-center height fabricated from 20 gauge stainless steel, #4 finish (polished directional satin).

D. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, Stainless steel, #4 finish to match door.

E. Curtain Jamb Guides: Stainless steel, with exposed #4 finish to match curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

F. Hood: Hood will enclose curtain coil and counterbalance mechanism and is fabricated of sheet metal, flanged at top for attachment to header and flanged at bottom to provided longitudinal stiffness.
   1. Material: 24-guage stainless steel, #4 finish to match curtain slats.
   2. Shape: As shown on Drawings.
   3. Mounting: As shown on Drawings.

G. Locking Devices: Equip door with locking device assembly.
   1. Locking Device Assembly: Single-jamb side locking bars, operable from inside and outside with cylinders.

H. Electric Door Operator:
   1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
   2. Operator Location: Top of hood.
   3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
   4. Motor Exposure: Interior.

5. Emergency Manual Operation: Push-up type.
6. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
   a. Sensor Edge Bulb Color: Black.
7. Control Station(s): Where shown on Drawings.

2.04 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.05 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
   1. Lock Cylinders: Provide cylinders specified in Division 08 Section "Door Hardware." and keyed to building keying system.
   2. Keys: Provide three for each cylinder.

B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

C. Chain Lock Keeper: Suitable for padlock.

2.06 CURTAIN ACCESSORIES

A. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

B. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Testing for manually operated doors shall allow resetting by opening the door without retensioning the counterbalance mechanism. Automatic-closing device shall be designed for activation by the following:
   1. Replaceable fusible links with temperature rise and melting point of 165 deg F interconnected and mounted on both sides of door opening.
   2. Building fire-detection, smoke-detection, and -alarm systems.

2.07 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
   1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.08 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
   1. Comply with NFPA 70.
   2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.
   1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
   1. Electrical Characteristics:
   2. Phase: Single phase.
      a. Volts: 115 V.
      b. Hertz: 60.
   3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
   4. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
   5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. For fire-rated doors, activation delays closing.
   1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
   1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.09 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

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

3.02 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

E. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

F. Fire-Rated Doors: Install according to NFPA 80.

G. Power-Operated Doors: Install according to UL 325.

3.03 FIELD QUALITY CONTROL

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

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.
   2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.04 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.
   2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.
   3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.05 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.06 CLEANING AND PROTECTION

A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.

B. Protect installed products until completion of project.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to perform startup service.
   1. Perform installation and startup checks according to manufacturer's written instructions.
   2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 08 3323

SECTION 08 4113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Exterior thermally-broken storefront framing, with project out windows.
   2. Interior non-thermally broken storefront framing.

B. Related Sections:
   1. Division 07 Section "Joint Sealants" for system joint sealants.
   2. Division 08 Section "Glazing" for glazing.
   3. Division 08 Section "Door Hardware" for door hardware.

1.03 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

B. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).

C. AAMA: American Architectural Manufacturers Association.

D. AWS: American Welding Society.

E. ASTM: American Society for Testing and Materials.

F. BHMA: Builders Hardware Manufacturers Association.

G. ICC: International Code Council.

H. SSPC: The Society for Protective Coatings.

I. UL: Underwriters Laboratories, Inc.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM).
   1. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   2. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   3. ASTM B 368 - Standard Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test).
   4. ASTM C 236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box.
   5. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

6. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
7. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
8. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
9. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
10. ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

B. American Architectural Manufacturers Association (AAMA):
1. AAMA 501 - Method of Test for Exterior Walls.
2. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
3. AAMA 503 - Voluntary Specifications for Field Testing of Storefront, Curtain Walls and Sloped Glazing Systems
4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections.
6. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
7. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
8. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.

C. ANSI Z97.1 - American National Standard for Safety Glazing Materials used in Buildings - Safety Performance Specifications and Methods of Test.

D. 16 CFR 1201 - Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials - codified at Title 16, Part 1201 of the Code of Federal Regulations.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
2. Elevations at 1/4 inch scale.
3. Detail sections of typical composite members.
4. Anchors and reinforcement.
5. Hardware mounting heights.
6. Glazing details.
7. Miscellaneous cover, corner and closure pieces.
8. Infill panels.
9. Integral sunshade.

10. Vented aluminum storefront windows.
11. For entrance doors, coordinate with hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch lengths of full-size components and showing details of the following:
1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

F. Other Action Submittals:
1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Delegated Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in jurisdiction of Project, responsible for their preparation.
1. Detail fabrication and assembly of aluminum-framed systems.
2. Include design calculations.

H. Qualification Data: For qualified Installer.

I. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

K. Source quality-control reports.

L. Quality-Control Program for Structural-Sealant-Glazed System: Include reports.

M. Field quality-control reports.

N. Maintenance Data: For aluminum-framed systems to include in maintenance manuals. Refer to documentation requirements in Division 01 Section “Contract Closeout.”

O. Warranties: Sample of special warranties. See documentation requirements in Division 01 Section “Close-out Submittals.”

P. Close-out Submittal: Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
   1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Meetings."

G. Mockups: Build mockups to verify selections made under submittals above and to set quality standards for installation.
   1. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
      a. Build mockup of typical wall areas as shown on Drawings.
      b. Field testing shall be performed on mockups according to requirements in "FIELD QUALITY CONTROL" article.
      c. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Noise or vibration caused by thermal movements.
   c. Water leakage through fixed glazing and framing areas.
   d. Failure of operating components.
2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Delta E 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, peeling, or chipping.
2. Warranty Period: 10 years from date of Substantial Completion.

1.09 MAINTENANCE SERVICE

A. Entrance Door Hardware:
1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Shop Drawings, Product Data, Samples," to design aluminum-framed entrances and storefronts.

B. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
   a. Deflection exceeding specified limits.
   b. Thermal stresses transferring to building structure.
   c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
   d. Glazing-to-glazing contact.
   e. Noise or vibration created by wind and by thermal and structural movements.
   f. Loosening or weakening of fasteners, attachments, and other components.
   g. Sealant failure.
   h. Failure of operating units.

C. Design aluminum-framed systems, including comprehensive engineering analysis by a qualified Professional Engineer, licensed in the State of Oregon, using performance requirements and design criteria indicated.

D. Structural Loads:

1. Wind Loads: As indicated on Structural Drawings.
2. Seismic Loads: As indicated on Structural Drawings.

E. Deflection of Framing Members:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.

F. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, as but not fewer than 10 seconds.

G. Story Drift: Provide aluminum-framed systems that accommodate design displacement of adjacent stories indicated.
1. Design Displacement: As indicated on Structural Drawings.
2. Test Performance: Meet criteria for passing, based on building occupancy type, when tested according to AAMA 501.4 at design displacement and 1.5 times design displacement.

H. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

I. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

J. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

K. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
1. Glass to Center:
   a. low-e: 62 frame and 68 glass.
   b. clear: 63 frame and 56 glass.
2. Storefront Doors: Provide entrance doors having a condensation resistance factor shall not be less than 46 frame and 65 glass when tested according to AAMA 1503.

L. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
   1. Glass to Center:
      a. low-e: 0.38 or better.
      b. clear: 0.61.
   2. Storefront Doors: Provide entrance doors having an average U-factor of not more than 0.60 when tested according to AAMA 1503 or NFRC 100.
   3. Operable Window: Provide entrance doors having an average U-factor of not more than 0.40 when tested according to AAMA 1503 or NFRC 100.

M. Storefront Doors: All storefront doors both exterior and interior are to provide in excess of 50.1 percent glazed area. This is calculated area of storefront door framing members including all stiles, rails and glazing stops. Refer to "Submittals" article for requirements for storefront door submittal. Doors not complying with this performance requirement are not allowed.

N. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
   1. Glass to Exterior - 38 (STC) and 31 (OITC) when glazed with 1 inch thick insulating glass units (glazing assembly: 1/4 inch thick tempered glass - 1/2 inch air space - 1/4 inch thick tempered glass).

2.02 MANUFACTURERS

A. Basis-of-Design Manufacturer for Storefront Systems: Subject to compliance with requirements, provide products specified below by Kawneer North America, an Arconic company, or comparable products by one of the following:
   1. Arcadia, Inc.
   2. EFCO Corporation.

B. Storefront Types:
   1. Exterior Storefront:
      a. Kawneer Trifab 451 T, Thermal Storefront Framing.
      b. Dimensions: 2 inches by 4-1/2 inches.
   2. Interior Storefront:
      a. Where 1/4 or 3/8 inch thick glazing is indicated: Kawneer Trifab 450; refer to Drawings for locations.
         1) Dimensions: 1-3/4 inches by 4-1/2 inches.
      b. Where 1 inch glazing is indicated: Kawneer Trifab 451; refer to Drawings for locations.
         1) Dimensions: 2 inches by 4-1/2 inches.

C. Storefront Window System: Manufacturer's standard units, complying with AAMA/WDMA/CSA 101/I.S.2/A440.
   1. Kawneer OptiQ AA 4325 Series windows.
      a. Window Type: Awning.
      b. Minimum Performance Class: CW.
      c. Minimum Performance Grade: PG80-AP.
      d. Hardware: Manufacturer's standard; of aluminum, stainless steel, die-cast steel, malleable iron, or bronze; including the following:
         1) Cam-action sweep sash lock and keeper at meeting rails.
         2) 4 bar hinge.
         3) Limit Devices: Designed to restrict sash opening; limit clear opening to 4 inches for ventilation; with custodial key release.

e. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, complying with SMA 1004 or SMA 1201.

D. Entrance Doors:
1. Storefront Entry Doors: Kawneer Insulpour 500T Wide Stile thermally broken doors within thermally broken door frames. Refer to Door Schedule on Drawings and Division 08 Section "Door Hardware" for hardware not specified herein.
a. Kawneer extrusion components consist of the following:
1) Top Rail: 5 inches.
2) Panic Mid-Rail: Provide only where indicated on Drawings; 4 7/16 inches.
3) Bottom Rail: 10 inches.
4) Vertical Stile: 5 inches.
5) Glass Stop: As provided by manufacturer.
6) Pull: Kawneer; CO-12/CP-11 push/pull set in finish selected by Architect.
2. Refer to Drawings for elevations of doors.

2.03 MATERIALS

A. Aluminum: Extruded aluminum shall be 6063-T6 alloy and temper.
1. Sheet and plate:
2. Extruded bars, rods, profiles, and tubes:
3. Extruded structural pipe and tube.
4. Structural profiles.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.04 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally improved.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: As indicated.

B. Formed Trim: Provide aluminum formed trim in profiles indicated.
1. Type: Extrusion wherever possible, otherwise fabricate from brake shaped aluminum plate.
2. Finish: Match framing members.
3. Material Thickness: Minimum 0.080 inch frame and 0.125 inch vent.
4. Provide watertight visible joints with no visible fasteners.

C. Compensation Channels: Provide compensation channels to match system material and finish where required by manufacturer or indicated in Drawings. Provide all components for compensation channel system including fasteners and attachment devices.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
   2. Reinforce members as required to receive fastener threads.
   3. Do not use exposed fasteners except for application of hardware. For application of hardware, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, or fabricated from stainless steel.

F. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

G. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials or Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.

H. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
   1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.05 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
   1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
      a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
      b. Color: As selected by Architect.

2.06 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
   1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

C. HM Frame and Aluminum Frame Separation: Isolation, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer.

2.07 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing from exterior for vision glass and exterior for spandrel glazing or metal panels.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly using shear-block system.

F. Entrance Door Hardware Installation: Coordinate factory installed entrance door hardware to the greatest extent possible.

2.08 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.02 INSTALLATION

A. General:
   1. Comply with manufacturer's written instructions.
   2. Do not install damaged components.
   3. Fit joints to produce hairline joints free of burrs and distortion.
   4. Rigidly secure nonmovement joints.
   5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
   6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.03 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
   1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
   2. Alignment:
      a. Where surfaces about in line, limit offset from true alignment to 1/16 inch (1.5 mm).
      b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.04 FIELD QUALITY CONTROL

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

B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
   1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft. of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft
   2. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

3.05 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
   1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 08 4113

SECTION 08 4513 - STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes aluminum-framed assemblies glazed with structured-polycarbonate panels as follows:
   1. Wall assemblies.
   2. Roof assemblies.
   3. Skylight assemblies.

B. Related Sections:
   1. Division 07 Section "Standing Seam Metal Roof Panels."
   2. Division 13 Section "Metal Building Systems."

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.

B. Sustainable Design Submittals:
   1. Product Data: For sealants, indicating VOC content.
   2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For panel assemblies.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.

D. Samples: In manufacturer's standard size.
   1. For each type of structured-polycarbonate panel.
   2. For each type of exposed finish for framing members.

E. Fabrication Samples: Of each framing system intersection and adjacent panels, made from 12-inch (305-mm) lengths of full-size framing members and showing details of the following:
   1. Joinery.
   2. Anchorage.
   3. Expansion provisions.
   4. Structured-polycarbonate panels.
   5. Flashing and drainage.

F. Delegated-Design Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified [Installer] [testing agency].

B. Product Test Reports: For each structured-polycarbonate-panel assembly, for tests performed by a qualified testing agency.

C. Evaluation Reports: For structured-polycarbonate-panel assemblies from ICC-ES.

D. Field quality-control reports.

E. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Maintenance Data: For panel assemblies to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical panel assemblies as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Deterioration of metals[, metal finishes,] and other materials beyond normal weathering.
      c. Water leakage.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace structured-polycarbonate panels that exhibit defects in materials or workmanship within specified warranty period.
   1. Defects include, but are not limited to, the following:
      a. Delamination.
      b. Color changes exceeding requirements.
      c. Losses in light transmission beyond 6 percent from original when measured according to ASTM D1003.

2. Warranty Period: 10 years from date of Substantial Completion.

C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design structured-polycarbonate-panel assemblies.

B. Structural Loads: As indicated on Drawings.

C. Deflection Limits:
1. Vertical Panel Assemblies: Limited to 1/120 of clear span for each assembly component.
2. Overhead Panel Assemblies: Limited to 1/120 of clear span for each assembly component.

D. Structural-Test Performance: Panel assemblies tested according to ASTM E330, as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified deflection limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding [0.2] <Insert number> percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft. (300 Pa)] [10 lbf/sq. ft. (480 Pa)] [15 lbf/sq. ft. (720 Pa)] <Insert value>.

F. Water Penetration under Dynamic Pressure: Provide panel assemblies that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..

G. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F, material surfaces.

2.02 STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

A. Structured-Polycarbonate-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with structured-polycarbonate panels.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. CO-EX Corp.
   b. CPI Daylighting, Inc.
   c. Duo-Gard Industries Inc.
   d. Energy-Glazed Systems, Inc.
   e. Gallina USA, LLC.
   f. Major Industries, Inc.
   g. Super Sky Products Inc.
   h. Wasco - Part of VELUX Commercial.

2.03 STRUCTURED-POLYCARBONATE PANELS

A. Structured-Polycarbonate Panels: Translucent, extruded-polycarbonate sheet with multiwall cellular cross section that provides isolated airspaces and that is coextruded with a UV-protective layer.

B. Panel Thickness: Nominal [5/16 inch (8 mm)] [3/8 inch (10 mm)] [1/2 inch (12 mm)] [5/8 inch (16 mm)] [1 inch (25.4 mm)] <Insert thickness>.

C. UV Resistance: [Not required] [On outer surface] [On both surfaces] [Coextruded into panel, not coated].

D. Color: Transparent, colorless.

E. Panel Performance:
   1. Plastic Self-Ignition Temperature: 650 deg F or more according to ASTM D1929.
   2. Smoke-Developed Index: 450 or less according to ASTM E84, or 75 or less according to ASTM D2843.
   3. Combustibility Classification: [Class CC1] [Class CC2] based on testing according to ASTM D635.
   4. Roof-Covering Classification: [Class A] [Class B] [Class C] according to ASTM E108 or UL 790.
   5. Interior Finish Classification: [Class A] [Class B] [Class C] based on testing according to ASTM E84.
   6. Color Change: Not more than 3.0 units Delta E, when measured according to ASTM D2244, after outdoor weathering compliant with procedures in ASTM D1435.
      a. Outdoor Weathering Conditions: 60 months in Arizona or 120 months in a moderate North American climate.
   7. Impact Resistance: No failure at impact of [200 ft. x lbf (271 J) according to freefalling-ball impact test using a 3-1/2-inch- (89-mm-) diameter, 6.3-lb (2.9-kg) ball.

2.04 ALUMINUM FRAMING SYSTEMS

A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
   1. Construction: Thermally broken, extruded aluminum.

B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
   1. Sheet and Plate: ASTM B209 (ASTM B209M).
   2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).
   3. Extruded Structural Pipe and Tubes: ASTM B429 (/B 429M).

4. Structural Profiles: ASTM B308 (/B 308M).

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.

D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.
1. At closures, retaining caps, or battens, use ASTM A193, 300 series stainless-steel screws.
2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.

E. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

F. Exposed Flashing and Closures: Aluminum sheet not less than 0.050 inch thick, finished to match framing.

G. Framing Gaskets: Manufacturer's standard gasket system with low-friction surface treatment designed specifically for retaining structured-polycarbonate panels.

H. Frame-System Sealants: As recommended in writing by manufacturer or as otherwise specified in Division 07 Section "Joint Sealants."
1. Verify sealant has a VOC content of 250 g/L or less.

I. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.05 FABRICATION

A. Fabricate aluminum components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Internal guttering systems or other means to drain water passing through joints and moisture migrating within assembly to exterior.

B. Fabricate aluminum sill closures with weep holes and for installation as continuous component.

C. Reinforce aluminum components as required to receive fastener threads.

2.06 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.02 INSTALLATION

A. General: Comply with manufacturer's written instructions. Install Structured Polycarbonate Panel Assemblies including aluminum flashing, fasteners, hardware, gaskets, joint sealants, and glazing materials required for a complete, weathertight installation.
   1. Do not install damaged components.
   2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
   3. Rigidly secure nonmovement joints.
   4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
   5. Seal joints watertight unless otherwise indicated.

B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.

C. Install components plumb and true in alignment with established lines and elevations.

D. Skylight Assemblies: Install continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Install components to drain water passing through joints and moisture migrating within assembly to exterior.

E. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
   1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
   2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, but no greater than 1/2 inch over total length.

F. Install sheet metal flashing as specified elsewhere in specifications.

3.03 FIELD QUALITY CONTROL

A. Repair minor damages to metal finish or glazing in accordance with manufacturer’s instructions. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 08 4513

SECTION 08 5113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Aluminum windows for exterior locations.
   2. Factory glazing.

B. Operating hardware.

C. Related Sections:
   1. Division 07 Section "Fluid-Applied Water Membrane Air Barriers" for sealing frame to weather barrier installed on adjacent construction.
   2. Division 07 Section "Joint Sealants" for sealing joints between window frames and adjacent construction.
   3. Division 08 Section "Glazing."

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

C. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2012.

D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

H. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

K. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

L. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

M. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

N. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene at project site one week before starting work of this Section.

1.05 SUBMITTALS

A. Product Data: Provide component dimensions, information on glass and glazing, and internal drainage details.

B. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, window details and installation requirements.

C. Samples: Submit two samples, 12 by 12 inch (300 by 300 mm) in size illustrating typical corner construction, accessories, and finishes.

D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
1. Evidence of AAMA Certification.
2. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.09 WARRANTY

A. See Division 01 Section "Warranties and Bonds" for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide 10 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN - CW PERFORMANCE CLASS WINDOWS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of CW, and Performance Grade 40.

2.02 MANUFACTURERS

A. Basis of Design Product: Subject to compliance with requirements, provide Milgard Thermally Impoved Aluminum Series Windows, www.milgard.com 1-800-645-4273, or comparable product by one of the following:
   1. Arcadia, Inc
   2. Kawneer.
   3. Quaker Windows and Doors.
   4. TRACO
   5. Wausau Window and Wall Systems

2.03 WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with related flashings, and anchorage and attachment devices.
   1. Frame Depth: 2-1/4 inches (57.1 mm).

2. Provide units factory glazed.
3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
4. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
5. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
7. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F (82.2 degrees C) surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

B. Fixed, Non-Operable Type:
1. Construction: Thermally broken.
2. Nailing fin: manufacturer's standard nailing fin.
3. Glazing: Insulating glass units; clear; low-e.
4. Exterior Finish: Class II color anodized.
5. Interior Finish: Class II color anodized.

C. Window Groups: For groups of windows use Double Jamb with Narrow Sightline in between.

D. Outswinging Casement Type:
1. Construction: Thermally broken.
2. Glazing: Single; clear; transparent.
3. Exterior Finish: Class I natural anodized.
4. Interior Finish: Class I natural anodized.

2.04 PERFORMANCE REQUIREMENTS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
1. Performance Class (PC): CW.
2. Performance Grade (PG): 40, with minimum design pressure (DP) of 40.10 psf (1920 Pa).

B. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.

C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 6 psf (287.28 Pa).

D. Air Leakage: Maximum of 0.1 cu ft/min sq ft (0.5 L/sec sq m) per unit area of outside frame dimension, with 6.27 psf (300 Pa) differential pressure when tested in accordance with ASTM E283.

E. Fenestration Assembly Thermal Transmittance (U-value): Comply with ASHRAE Std 90.1 I-P for building envelope requirements for applicable climate zone.

2.05 COMPONENTS

A. Frames: 1-1/4 inch wide by 2-1/4 inch deep profile, of 0.060 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of screw fastened type.

B. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

C. Fasteners: Stainless steel.

D. Glazing Materials: As specified in Division 08 Section "Glazing."

2.06 MATERIALS

A. Aluminum Members:
1. Extruded aluminum prime billet 6063-T6 alloy for primary components, 6063-T6, or 6061-T6 for structural components, all in accordance with (ASTM B221).

B. Structural Thermal Break Construction:
1. Frame and sash members shall include a structural thermal barrier, applied in the manufacturer’s facility, using concealed low-conductance poured-in-place polyurethane in a pre-treated cavity.
2. After proper curing, the aluminum bridge section must be removed to provide a 1/2” minimum separation between interior and exterior metal surfaces.
3. The thermal barrier cavity shall have a manufactured mechanical lock applied consisting of abrading or lancing of the extrusion cavity prior to application of poured-in-place polyurethane.
4. Thermal Break Performance Requirements:
   a. Shear strength: minimum 2,500 Lbf in accordance with (AAMA TIR-A8).
   b. Flexural strength: minimum 19,000 psi in accordance with (AAMA D 790).
   c. Thermal conductivity of barrier material: maximum 0.84 BTU-in/(hr-ft2-°F) in accordance with (ASTM C 518).
   d. Systems employing non-structural thermal barriers, or barrier systems absent of a mechanical lock application are not acceptable.

2.07 HARDWARE

2.08 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34 Electrolytically deposited colored anodic coating not less than 0.4 mils (0.01 mm) thick.

C. Finish Color: As selected by Architect from manufacturer's standard range.

D. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

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

B. Install window assembly in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Install operating hardware not pre-installed by manufacturer.

G. Install glass in accordance with requirements specified in Division 08 Section "Glazing."

3.03 FIELD QUALITY CONTROL

A. Provide services of aluminum window manufacturer's field representative to observe for proper installation of system and submit report.

B. Provide field testing of installed aluminum windows by AAMA accredited independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
   1. Perform tests on one individual window of each type in designated locations as directed by Architect.
   2. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 4 psf (___ Pa).
   3. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.27 psf (300 Pa).
      a. Maximum allowable rate of air leakage is 1.5 times specified rate of 0.10 cfm/sq ft (0.5 L/s sq m) as indicated in AAMA/WDMA/CSA 101/I.S.2/A440.

C. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.04 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION 08 5113

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SECTION 08 6200 - UNIT SKYLIGHTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Self-flashing unit skylights with integral curbs.

B. Related Requirements:
   1. Division 08 Section "Structured-Polycarbonate-Panel Assemblies" for metal-framed skylights glazed with structured-polycarbonate panels.
   2. Division 13 Section "Metal Building Systems" for inclusion of skylights as part of pre-engineered metal building system.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of unit skylight.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.
   2. Motors: Show nameplate data, power requirements, ratings, characteristics, and mounting arrangements.

B. Shop Drawings: For unit skylight work.
   1. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.
   2. Manual Operators: Show locations, mounting, and details for installing operator components and controls.
   3. Motor Operators: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
      a. Wiring Diagrams: For power, signal, and control wiring for electric motors of operable unit skylights.
   4. Multiple Units: Methods of connection and structural support for multiple units clustered together.

C. Aluminum Finish Samples: For each type of exposed finish required, in a representative section of each unit skylight in manufacturer's standard size.

D. Glazing Samples: For each color and finish of glazing indicated, 12 inches square and of same thickness indicated for the final Work.

E. Product Schedule: For unit skylights. Use same designations indicated on Drawings.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified manufacturer.

B. Product Test Reports: For each type and size of unit skylight, for tests performed within the last four years by a qualified testing agency. Test results based on testing of smaller unit skylights than specified will not be accepted.

C. Sample Warranty: For special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Maintenance Data: For unit skylights to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.

1.08 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Uncontrolled water leakage.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      c. Yellowing of acrylic glazing.
      d. Breakage of polycarbonate glazing.
      e. Deterioration of insulating-glass hermetic seal.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kingspan Light + Air, North America; Pre-Engineered Quadwall Skylights or a comparable product by one of the following:
   1. American Skylights, Inc.
   2. Auburn Skylights.
   3. Birdview Skylights.
   4. C/S Groups.
   5. CPI International.
   6. Dur-Red Products.
   7. Energy-Glazed Systems, Inc.
   8. Exarc Skylights, Inc.
   9. Fiore Skylights, Inc.

10. Fox Lite, Inc.
11. Kalwall Corporation.
12. Lane-Aire Manufacturing Corp.
13. Plasteco, Inc.
14. Plastic Engineering Company of Tulsa, Inc.
15. Skyline Sky-Lites, LLC.
16. Solar Industries, Inc.
17. Sunglo Skylight Products.
18. Sunoptics Skylights and Daylighting Systems; Acuity Brands International, Inc.
19. Velux America, LLC.
20. Velux Commercial (Wasco).
21. Wisconsin Solar Design Inc.

2.02 PERFORMANCE REQUIREMENTS

A. Unit Skylight Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   1. Performance Class and Grade: Class CW-PG 30 or better.
   2. Certification: AAMA-, WDMA-, or CSA-certified unit skylights with label attached to each.

B. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of 0.40 or in accordance with Oregon Structural Code, whichever is less.

C. Outside-Inside Transmission Class (OITC): Rated for not less than 22 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

2.03 UNIT SKYLIGHTS

A. General: Provide factory-assembled unit skylights that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.

B. Unit Shape and Size: As indicated on Drawings.

C. Polycarbonate Glazing: Thermoformable, extruded monolithic sheets, UV resistant, burglar-resistance rated according to UL 972, and with average impact strength of 12 to 16 ft-lb/in. of width when tested according to ASTM D256, Test Method A (Izod).
   1. Single-Glazing Profile: Pyramid, 30-degree slope.
      a. Thickness: Not less than thickness required to exceed performance requirements.
      b. Color: As selected by Architect from full range of industry colors.
   2. Self-Ignition Temperature: 650 deg F (343 deg C) or more for plastic sheets in thickness indicated when tested according to ASTM D1929.
   3. Smoke-Production Characteristics: Smoke-developed index of 450 or less when tested according to ASTM E84, and smoke density of 75 or less when tested according to ASTM D2843
   4. Burning Characteristics: Tested according to ASTM D635. Class CC1, burning extent of 1 inch or less for nominal thickness of 0.060 inch or thickness indicated for use.

D. Integral Curb: Extruded-aluminum profile, self-flashing type.
   1. Extruded-Aluminum Shapes: ASTM B221 (ASTM B221M), alloy and temper to suit structural and finish requirements but with not less than the strength and durability of Alloy 6063-T52.
   2. Height: As indicated.

3. Construction: Single wall.
4. Insulation: None.

E. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.

2.04 ACCESSORY MATERIALS

A. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal as recommended by manufacturer. Finish exposed fasteners to match material being fastened.
1. Where removal of exterior exposed fasteners might allow access to building, provide nonremovable fastener heads.

B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat.

2.05 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.02 INSTALLATION

A. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.

B. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing unit skylights.

C. Install unit skylights level, plumb, and true to line, without distortion.

D. Anchor unit skylights securely to supporting substrates.

E. Where aluminum surfaces of unit skylights will contact another metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by unit skylight manufacturer.

3.03 CLEANING

A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 08 6200

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SECTION 08 8000 - GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
      a. Windows.
      b. Doors.
      c. Storefront.
      d. Hollow metal doors and frames.
      e. Insulating glass.
      f. Safety glazing.

B. Related Sections:
   1. Division 08 Section “Hollow Metal Doors and Frames.”
   2. Division 08 Section “Aluminum Framed Entrances and Storefronts.”
   3. Division 08 Section “Aluminum Windows.”

1.03 REFERENCES

A. Abbreviations and Acronyms:
   1. FT: Fully Tempered.
   2. GANA: Glass Association of North America.
   3. HS: Heat-strengthened.
   4. IGCC: Insulating Glass Certification Council.
   5. IGMA: Insulating Glass Manufacturers Alliance.
   6. LBNL : Lawrence Berkeley National Laboratories.
   7. Low-E: Low emissivity.
   8. LSG : Light to Solar Gain.
   9. NFRC: National Fenestration Rating Council.
   10. SHGC: Solar Heat Gain Coefficient.
   11. SC: Shading Coefficient.
   12. VLT: Visible Light Transmittance.

B. Reference Standards: This section does not require compliance with standards, but is merely a listing of those used. If compliance is required, statements will be included in the appropriate Section.
   1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
   2. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
   3. ASTM C 1036 - Standard Specification for Flat Glass.
   4. ASTM C 1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

5. ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
6. ASTM E 546 - Standard Test Method for Frost/Dew Point of Sealed Insulating Glass Units.
7. ASTM E 576 - Standard Test Method for Frost/Dew Point of Sealed Insulating Glass Units in the Vertical Position.
8. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
9. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
10. ANSI Z97.1 - Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.
11. BS EN 14179 - Glass in building - Heat-soaked thermally-toughened soda lime silicate safety glass.
12. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

1.04 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Fabricators: Firms that Fabricate glazing assemblies, including insulated glazing units. Frabricated insulated glazing units shall comply with ASTM E2188, E2189, and E2190. Approved manufacturers shall have certifications including:
1. IGCC: Insulating Glass Certification Council.
2. IGMA: Insulating Glass Manufacturers Alliance.
3. SGCC: Safety Glazing Certification Council.
4. Vitro Architectural Glass CFP: Certified Fabricator Program.
5. Guardian Select SunGuard Fabricator.

C. Deterioration of Coated Glass: Defects developing from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer’s written instructions. Defects include peeling, cracking and other indications of deterioration in metallic coating.

D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer’s written instructions. Evidence of failure is the obstruction of vision by dust, moisture or film on interior surfaces of glass.

E. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

F. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

1.05 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.06 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
   1. Coated glass.
   2. Fire-resistive glazing products.
   3. Fire-protective glazing products.
   4. Insulating glass.

C. Glazing Accessory Samples: For gaskets, sealants, and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.07 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers, manufacturers of insulating-glass units with sputter-coated, low-e coatings, glass testing agency, and sealant testing agency.
   1. Glass Fabrication Certifications.
   2. Glass Lamination Certifications.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for coated glass, insulating glass, glazing sealants, and glazing gaskets.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.08 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Fabrication processes, including low emissivity and reflective coatings, insulating, laminated, silk-screening and tempering shall be manufactured by a single manufacturer with a minimum of ten (10) years of fabrication experience and meet ANSI/ASQC 9002 1994. Qualified insulating-glass manufacturers shall have a location and equipment that is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations: Obtain glass and glazing materials from one source for each product indicated. Coatings and finished assemblies, such as insulating units and laminated units, to be manufactured by the same fabricator in order to have a common source of warranty.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Install glazing in mockups specified in other Division 08 Sections to match glazing systems required for Project, including glazing methods.
   2. Scheduling: Notify Architect seven days in advance of dates and times when mockups will be available for viewing.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
   2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   3. Test no fewer than eight samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Protect glass from edge damage during handling. For insulating units exposed to substantial altitude changes, comply with insulating glass manufacturers written recommendations for venting and sealing to avoid hermetic seal ruptures.
   2. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.12 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: 10 years from date of manufacture.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: 10 years from date of manufacture.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. Bendheim.
   2. Cardinal Glass Industries.
   3. Guardian Glass.
   4. Hartung Glass.
   5. J.E. Berkowitz.
   6. Northwestern Industries, Inc.
   7. Oldcastle Building Envelope.
   8. Viracon, Inc.
   9. Vitro Architectural Glass.

2.02 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
   1. Design Wind Pressures: As indicated on Drawings.
   2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.03 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
1. Minimum Glass Thickness for Exterior Lites: 6.0 mm.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.04 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2. Maximum peak to valley rollerwave 0.003 inch in the central area and 0.008 inch within 10.5 inches of the leading and trailing edge
3. For clear or low-iron glass 1/4 to 3/8 inch thick without ceramic frit or ink, maximum plus or minus 100 mD (millidiopter) over 95 percent of the glass surface.
4. Maximum bow and warp 1/32 inch per lineal foot.
5. For uncoated glass, comply with requirements for Condition A.
6. For coated vision glass, comply with requirements for Condition C (other coated glass).
7. All tempered safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.
8. Provide heat soak testing for all fully tempered glass conforming to EN14179 which includes a 2 hour dwell at 290 deg C, plus or minus 10 deg C.

C. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and complying with other requirements specified.

D. Insulating Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 2190 and with requirements specified in this Article and in Part 2 Insulating-Glass Units Article.
1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 Performance Requirements Article.
2. Provide FT (fully tempered) glass lites where safety glass is indicated or required.
3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit’s edge.
4. Sealing System: Comply with requirements in Division 07 Section "Joint Sealants." Dual seal, with primary and secondary sealants of polyisobutylene and silicone.
5. Spacer Specifications: Manufacturer’s standard spacer material and construction complying with the following requirements:
    a. Spacer Material: Aluminum with mill or clear anodic finish.
    b. Desiccant: Molecular sieve or silica gel, or blend of both.
    c. Corner Construction: Manufacturer’s standard corner construction.

2.05 LOW-E COATINGS

A. Low-e Coating: Vacuum deposition (sputter-coating) process.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Vitro Architectural Glass; Solarban 60, or comparable product by one of the following:
1. Bendheim.
2. Cardinal Glass Industries.
3. Guardian Glass.
4. J.E. Berkowitz.
5. Oldcastle Building Envelope.
6. Viracon, Inc.

2.06 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, or, thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
   1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.07 GLAZING SEALANTS

A. General:
   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 790.
      b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
      c. May National Associates, Inc.; Bondaflex Sil 290.
      d. Pecora Corporation; 890.
      e. Sika Corporation, Construction Products Division; SikaSil-C990.
      f. Tremco Incorporated; Spectrem 1.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.08 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.09 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: 100% Silicone to prevent contamination with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Glazing Channel and Stop Profiles: aluminum channels supplied by CR Laurence Co., In., Finishing and Fabrication.
1. Glazing Channel Profile: Channel; aluminum; WU3BLSL: 1-inch high glazing channel; black powder coat finish.
2. Glazing Stop Profile: Channel; aluminum; WU1DUSL: 1 1/2-inch high glazing channel; black powder coat finish.

E. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

F. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

G. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

H. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.07 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.08 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.09 GLAZING SCHEDULE

A. Provide the following glass types, as indicated in elevations on Drawings:
   1. GL-1: Insulating glass unit (IGU) consisting of the following:
      a. Outer Lite: Minimum 1/4 inch thick clear, fully tempered glass with low-e coating on No. 2 surface.
      b. Airspace: Argon.
      c. Inner Lite: Minimum 1/4 inch thick clear, fully tempered glass.
   2. GL-2: Monolithic tempered glass, minimum 1/4 inch thick.

END OF SECTION 08 8000

SECTION 08 9000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:
   1. Fixed, extruded-aluminum louvers.
   2. Extruded aluminum horizontal screen.
   3. Louver/damper.
   4. Sheet blank off panel.

B. Related Sections:
   1. Division 08 Section "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
   2. Division 23 Sections for louvers that are a part of mechanical equipment.

1.03 PERFORMANCE REQUIREMENTS

A. Design louvers, including comprehensive engineering analysis by a qualified Professional Engineer, licensed in the state of Oregon, using structural and seismic performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
   1. Wind Loads: Determine loads based on pressures as indicated in the Structural Drawings and Notes.

C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
   1. See Structural General Notes for design earthquake spectral response acceleration, short period (Sds) for Project, and Component Importance Factor.

D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

C. Samples: For each type of metal finish required.

D. Performance Requirements Submittal: For louvers indicated to comply with structural and seismic performance requirements and design criteria, including analysis data signed and sealed by a qualified Professional Engineer, licensed in the state of Oregon, responsible for their preparation.

E. Product Test Reports: Based on tests performed according to AMCA 500-L.

1.05 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to product installation including, but not limited to, the following:
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 zinc coating, mill phosphatized.

D. Fasteners: Use types and sizes to suit unit installation conditions.
1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
3. For fastening stainless steel, use 300 series stainless-steel fasteners.
4. For color-finished louvers, use fasteners with heads that match color of louvers.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.02 FABRICATION, GENERAL

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

B. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, concealed from view, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

C. Provide sub-sills made of same material as louvers or extended sills for recessed louvers.

2.03 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louver:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties, Inc., Model 7” Deep Storm Resistant Fixed Horizontal Louver Model RS-7705 or comparable product by one of the following:

a. Air Balance Inc.; a Mestek company.
b. Air Flow Company, Inc.
c. Airolite Company, LLC (The).
d. All-Lite Architectural Products.
e. American Warming and Ventilating, Inc.; a Mestek company.
f. Arrow United Industries; a division of Mestek, Inc.
g. Ruskin Company.
h. Greenheck Fan Corporation.
i. Industrial Louvers, Inc.
j. Reliable Products, Inc.
k. Ruskin Company; Tomkins PLC.
l. United Enertech Corp.
m. Or approved.

2. Louver Depth: See drawing for deoths.
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch or frames.
4. Louver Performance Ratings:
   a. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.
   b. Air Performance: Intake Pressure drop at 900 fpm free area velocity 0.225 in. H2O. Exhaust pressure drop at 900 fpm free area velocity 0.194 in. H2O.
   c. Wind-Driven Rain Performance: AMCA certified and licensed to bear the AMCA seal. The louver test was based on a 39.370" x 39.370" core area. Unit tested at a rainfall rate of 3.0 inches per hour and with a wind directed to the face of the louver at a velocity 29.1-mph.
5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.04 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.

C. Louver Screening:
   1. Insect Screening: Stainless steel, 18-by-18 mesh, 0.009 inch wire.
   2. Bird Screening: Stainless steel, 1/2-inch-square mesh, 0.047-inchwire.

2.05 SHEET BLANK OFF PANEL

A. Provide manufacturer's standard insulated galvanized sheet metal blank off panel with painted finish on outboard (exposed exterior louver face) side. Insulation: Manufacturer's standard 2 inch thick board insulation with a minimum of R-4 per inch. Paint finish on "exterior' surface to match louver color. Wrap all edges and both surfaces of panel in sheet metal. Attach to interior face of louver. See Drawings for locations.

2.06 ALUMINUM FINISHES

A. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent 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.
   1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.

E. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

3.02 INSTALLATION OF FLEXIBLE FLASHING AT EXTERIOR LOUVERS DUCTWORK

A. At louver and ductwork joints cover all duct and louver sill and plenums bottoms with peel and stick asphaltic "Flexible Flashing" as specified in Division 06 Section “Sheathing."

B. Apply "flexible flashing" to the internal surfaces of the duct. Flashing to span the entire internal width of duct and return up the sides of the duct 3 inches vertically from bottom.

C. Extend flexible flashing on bottom and sides 2'-6" towards building interior from joint of duct and louver.

D. Flashing to lap over louver/duct joint. Make flashing from single sheet. No seams allowed in any direction.

E. Coordinate this work with Division 23 Heating, Ventilation and Air Conditioning, and Division 06 Section "Sheathing" work.

END OF SECTION 08 9000

SECTION 11 2429 - FACILITY FALL PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Supplying and installation of fall arrest roof systems and equipment for:
      a. Standing seam roof top anchor.

B. Related Sections:
   1. Division 07 Section "Standing Seam Metal Roof Panels" for attachment to standing seams.

1.03 REFERENCES

A. General: Work of this Section to conform to:
   1. OSHA: Occupational Safety & Health Administration (US Department of Labor; OSHA 1926.500, SubPart M (Fall Protection).
   2. Oregon Occupational Safety and Health Division's (Oregon OSHA) Standards; fall protection systems criteria and practices.
   3. ASTM A 123: (Standard Specification for Zinc Coating - Hot Dip Galvanizing - of Iron and Steel Products).
   4. ASTM Z 325: (Bolts, Nuts, and Washers).
   5. American Welding Society: AWS D1.1/D1.1M (Structural Welding Code - Aluminum welding).
   6. American Welding Society: AWS D1.2/D1.2M (Structural Welding Code - Steel welding)

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design fall protection systems.

B. Design fall arrest systems to withstand loads calculated in accordance with the requirements of Oregon OSHA.

C. Design Requirements:
   1. Manufacturer to carry liability insurance for products and completed operations in the to protect against product/system failure.
   2. Maintenance free design.
   3. Materials and sizing options, and thickness.
   4. Printed installation instructions.

1.05 SUBMITTALS

A. Manufacturer's descriptive literature for each product, including cross-sections and other details.

B. Manufacturer's printed installation instructions.

C. Copy of manufacturer's current liability insurance certificate.

D. Shop Drawings and Samples: In accordance with Division 01 Section "Shop Drawings, Product Data, Samples," submit shop drawings to show anchor layout indicating location and spacing of anchors, including dimensions, detail drawings of attachment to roof seams, design details, and similar data.

E. Delegated-Design Submittal: For fall protection systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Maintenance Submittal: Upon completion of Project, provide Owner with Log Book for mandatory annual inspection.

G. Record Drawings: Upon completion of Project, provide Owner with Drawing(s) showing layout of fall arrest anchor system.

1.06 QUALITY ASSURANCE

A. Fall Arrests and Anchors: Manufacturer to have minimum five (5) years documented experience in the design and fabrication of fall protection systems.

B. Installer Qualifications: Provide qualified technicians with a minimum of 2 years of experience with similar installations for the erection, assembly and installation of the fall arrest anchor system.

C. Compliance: Comply with all requirements of:
1. ICC: International Building Code.
2. Oregon OSHA.
3. Oregon Structural Specialty Code.

D. Preinstallation Conference: Conduct conference at Project site.

1.07 SPECIAL WARRANTY

A. Warranty products and installation for (5) five years from the date of Substantial Completion of the Work, to be free of leaks, condensation and defects in materials and/or manufacture.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis of Design Manufacturer: Subject to compliance with requirements, provide Guardian Fall Protection Inc., (6305 South 231st Street Kent, WA, phone 800-466-6385, contact: Julie Shoffner or Charlie Garcia), Guardian fall protection system, or comparable products by one of the following:
1. Atlas Anchor Systems.
2. Fall Protection Distributors.
3. Honeywell.
4. Pro-Bel Enterprises, Ltd.
5. RoofTop Anchors.
6. S-5!

7. Super Anchor Systems.
8. Thaler Metal Industries.
9. 3M.

2.02 ROOF ANCHORS AND CABLE SYSTEM COMPONENTS

A. Fall Arrest Systems: Provide fall arrest roof anchors attached to standing seam metal roof, at locations shown on Shop Drawings.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Guardian Fall Protection: Permanent Adjustable Standing Seam Roof Anchor or comparable product by one of themanufacturers above.
      a. Part #: 53221.
      b. Material: Aluminum and stainless steel.
      c. Worker capacity: 130-420 lbs. (including all equipment).
      d. Compliant with all OSHA 1910, 1926 Subpart M, ANSI Z359.1-2007, and ANSI A10.32-2012 regulations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions. Verify site dimensions. Commencement of work will imply acceptance of prepared work.

3.02 PREPARATION

A. In the event of structural deficiencies, loose roofing, corrosion or deterioration, ensure that a structural engineer has assessed and approved all surfaces upon which the work of this Section depends. Institute repairs and/or reinforcement where necessary.

3.03 INSTALLATION

A. General Anchor Installation:
   1. Install anchors or equipment in accordance with manufacturer’s printed instructions, Shop Drawings and as specified.
   2. Ensure anchors or equipment is installed under the direct supervision of a Professional Engineer and Roofing Consultant.
   3. Where necessary, provide protection against deterioration due to contact of dissimilar materials.

3.04 FIELD QUALITY CONTROL

A. Comply with the requirements of Division 01 Section "Quality Requirements."

B. All anchor work may be inspected by a qualified testing agency, Structural Engineer and Roof Installer upon completion of work.

3.05 ADJUSTING AND FINAL INSPECTION

A. Verification: Verify that all manufactured units have been installed in accordance with specifications and details and will function as intended. Adjust any items where necessary to ensure proper operation.

B. Provide: Necessary documentation certifying system is acceptable for service (Engineer's Certificate of Acceptance).

3.06 CLEANING

A. Clean: Manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

3.07 OWNER TRAINING

A. An Owner Training program shall be provided for all employees who will be using the safety anchor fall protection system, to ensure that the purpose, function, and proper use of fall protection is understood by the Owner and that the knowledge and skills required for safe application and usage are acquired by the Owner. At minimum the program shall include, but not be limited to:
   1. A description of fall hazards at this location.
   2. Evaluation of methods to eliminate fall hazards.
   3. Procedures for using fall prevention and fall arrest systems.
   4. Fall arrest equipment limitations.
   5. Evaluation of total fall distance during fall arrest.
   6. Inspection and storage procedures for fall arrest equipment.

END OF SECTION 11 2429

SECTION 13 3419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Metal soffit panels.
5. Thermal insulation.
6. Personnel doors and frames.
7. Translucent panels.
8. Skylights.
9. Accessories.

B. Related Requirements:
1. Division 08 Section "Overhead Coiling Doors" for coiling vehicular doors in metal building systems.
2. Division 08 Section "Structured-Polycarbonate-Panel Assemblies."
3. Division 08 Section “Aluminum Windows.”
4. Division 08 Section "Unit Skylights" to be provided as part of the metal building system.
5. Division 08 Section "Glazing."

1.03 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.04 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.05 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.06 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    a. Metal roof panels.
    b. Metal wall panels.
    c. Thermal insulation and vapor-retarder facings.
    d. Translucent roof panels.

B. Sustainable Design Submittals:
1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:
1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
    a. Show provisions for attaching roof curbs, service walkways, platforms and pipe racks.
3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
    a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, skylights and items mounted on roof curbs.
    b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
    c. Show translucent panels.
4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
    a. Flashing and trim.
    b. Gutters.
    c. Downspouts.

D. Samples for Initial Selection: For units with factory-applied finishes, from manufacturer's full range of standard colors.

E. Delegated-Design Submittal: For metal building systems.
1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Provide Oregon PE stamped and signed drawings and calculations for submittal.

1.07 INFORMATIONAL SUBMITTALS

A. Qualification Data: For erector and manufacturer.

B. Welding certificates.

C. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
   1. Name and location of Project.
   2. Order number.
   3. Name of manufacturer.
   4. Name of Contractor.
   5. Building dimensions including width, length, height, and roof slope.
   6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
   7. Governing building code and year of edition.
   8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
   9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
   10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

D. Material Test Reports: For each of the following products:
   1. Structural steel including chemical and physical properties.
   2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   3. Tension-control, high-strength, bolt-nut-washer assemblies.
   4. Shop primers.
   5. Nonshrink grout.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
   2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of

water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect foam-plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
3. Complete installation and concealment of foam-plastic materials as rapidly as possible in each area of construction.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show 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 Hunter units when tested according to ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested according to 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.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Allied Buildings, www.alliedbuildings.com
2. Armstrong Steel Buildings, www.armstrongsteelbuildings.com
3. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
4. CHG Building Systems, www.chgbuildingsystems.com
5. Heritage Building Systems, www.heritagebuildings.com
6. Nucor Corporation, Nucor Buildings Group, www.nucorbuildingsystems.com
7. Pacific Building Systems, www.pbsbuildings.com
8. Varco Pruden, www.vp.com

B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.02 SYSTEM DESCRIPTION

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

B. Primary-Frame Type:
   1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.
   2. Truss-Frame Clear Span: Truss-member, structural-framing system without interior columns.

C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

E. Eave Height: Manufacturer's standard height, as indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on Drawings.

G. Roof Slope: As indicated on Drawings.

H. Roof System: Standing-seam, vertical-rib, metal roof panels.

I. Exterior Wall System: Corrugated lap-seam metal wall panels.

2.03 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design metal building system, using performance requirements and design criteria indicated.

B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated on Drawings, and in accordance to AHJ requirements.
   2. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
   3. Deflection and Drift Limits: No greater than the following:
      a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
      b. Girts: Horizontal deflection of 1/180 of the span.
      c. Metal Roof Panels: Vertical deflection of 1/180 of the span.
      d. Metal Wall Panels: Horizontal deflection of 1/180 of the span.
      e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
      f. Lateral Drift: Maximum of 1/200 of the building height.

C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing 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.

E. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
1. Wind Loads: As indicated on Drawings.

F. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
1. Uplift Rating: UL 90.

2.04 STRUCTURAL-STEEL FRAMING

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

B. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

C. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

D. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

E. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
3. Frame Configuration: As indicated on Drawings.
4. Exterior Column: Tapered.
5. Rafter: Tapered.

F. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.

G. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
a. Depth: As needed to comply with system performance requirements.
2. Purlins: Steel joists of depths indicated on Drawings.
3. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch-wide flanges.
a. Depth: As required to comply with system performance requirements.

4. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
5. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch-diameter, cold-formed structural tubing to stiffen primary-frame flanges.
6. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
7. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch, fabricated from zinc-coated (galvanized) steel sheet.
8. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
9. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

H. Bracing: Provide adjustable wind bracing [using any method] as follows:
1. Rods: ASTM A36/A36M; ASTM A572/A572M, Grade 50; or ASTM A529/A529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
2. Cable: ASTM A475, minimum 1/4-inch-diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
3. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

I. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

J. Materials:
1. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
3. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
4. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
5. Metallic-Coated Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.
6. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755/A755M.
    a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G90 coating designation.
    b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, SS, Grade 50 or 80; with Class AZ50 coating.
7. Steel Joists: Manufactured according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders"; with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated on Drawings and required for secondary framing.

8. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts[or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
9. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1 hardened carbon-steel washers.
    a. Finish: Mechanically deposited zinc coating, ASTM B695, Class 50.
10. Unheaded Anchor Rods: ASTM F1554, Grade 36 .
    a. Configuration: Straight.
    b. Nuts: ASTM A563 heavy-hex carbon steel.
    c. Plate Washers: ASTM A36/A36M carbon steel.
    d. Washers: ASTM F436 hardened carbon steel.
    e. Finish: Hot-dip zinc coating, ASTM F2329, Class C.
11. Headed Anchor Rods: ASTM F1554, Grade 36.
    a. Configuration: Straight.
    b. Nuts: ASTM A563 heavy-hex carbon steel.
    c. Plate Washers: ASTM A36/A36M carbon steel.
    d. Washers: ASTM F436 hardened carbon steel.
    e. Finish: Hot-dip zinc coating, ASTM F2329, Class C.

K. Finish: Factory primed and painted with one factory applied silicone-modified polyester topcoat, Duracoat DC5000 or comparable, standard gloss white color, over primer approved by topcoat manufacturer. Apply specified primer immediately after cleaning and pretreating.
1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.
    a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.05 METAL ROOF PANELS

A. Standing-Seam, Vertical-Rib, Metal Roof Panels: Formed with vertical ribs at panel edges and [intermediate stiffening ribs symmetrically spaced] [flat pan] between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
1. Preformed Metal Standing Seam Roofing System: Panels with mechanically seamed 2” high rib.
    a. Basis-of-Design Product: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company, SpanSeam Metal Roofing or comparable product by one of the following:
        1) CENTRIA Architectural Systems.
        2) Morin - A Kingspan Group Company.
        3) PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
        4) Talylor Metal Products.
2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.032 inch, 22 gauge nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
    a. Exterior Finish: Dura Tech 5000 (PVDF) polyvinylidene fluoride by AEP Span or comparable two-coat fluoropolymer resin coating system.
    b. Color: As selected by Architect from manufacturer's full range.
3. Joint Type: Mechanically seamed.

4. Panel Coverage: 16 inches.
5. Panel Height: 2 inches.

B. Finishes:
1. Exposed Coil-Coated Finish:
a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent 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. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.06 METAL WALL PANELS

A. Exposed-Fastener, Lap-Seam Metal Wall Panels: Factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
1. Corrugated-Profile, Exposed-Fastener Metal Wall Panels: Formed with alternating curved ribs spaced at 2.67 inches o.c. across width of panel.
a. Basis-of-Design Product: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company, Nu-Wave Corrugated Metal Panel or comparable product by one of the following:
1) CENTRIA Architectural Systems.
2) Morin - A Kingspan Group Company.
3) PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
4) Talylor Metal Products.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
a. Nominal Thickness: 0.034 inch, 22 gauge.
3. Exterior Finish: Dura Tech 5000 (PVDF) polyvinylidene fluoride by AEP Span or comparable two-coat fluoropolymer resin coating system.
a. Color: As selected by Architect from manufacturer's full range.

B. Finishes:
1. Exposed Coil-Coated Finish:
a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent 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. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.07 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Concealed-Fastener, Flush-Profile, Metal Soffit Panels: Formed with vertical panel edges and flush surface; with flush joint between panels; with 1-inch-wide flange for attaching interior finish; designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide AEP Span, A BlueScope Steel Company, Flush Panel or comparable product by one of the following:
      a. CENTRIA Architectural Systems.
      b. Morin - A Kingspan Group Company.
      c. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
      d. Talylor Metal Products.
   2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.02-inch, 24 gauge nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
      a. Exterior Finish: Fluoropolymer.
      b. Color: As selected by Architect from manufacturer's full range.
   3. Panel Coverage: 12 inches.
   4. Panel Height: 1 inch.

2.08 THERMAL INSULATION

A. Basis of Design Product: Subject to compliance with requirements, provide Simple Saver System, double layer system; as manufactured by Thermal Design, Inc.

B. Roof Metal Building Insulation: ASTM C 991, Type I, ASTM E 84, glass-fiber-blanket insulation; with a thermal resistance and thickness as follows:
   1. R-36; 11-1/2 inches, 8 inches plus 3-1/2 inches (two layers).

C. Wall Metal Building Insulation: ASTM C 991, Type I, ASTM E 136 and ASTM E 84, glass-fiber-blanket insulation; with a thermal resistance and thickness as follows:
   1. R-19; 8 inches.

D. Straps: For securing insulation between supports, 100 KSI minimum yield tempered, high-tensile-strength steel. Not less than 0.020-inch-thick by 1 inch by continuous length. Galvanized, primed and painted to match insulation facing.

E. Vapor-Barrier Liner Fabric: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96.
   1. Composition: Woven, reinforced, high-density polyethylene yarns coated on both sides with continuous white polyethylene coatings.

F. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.09 DOORS AND FRAMES

A. Related Requirements:
   1. Swinging Personnel Doors and Frames: As specified in Division 08 Section "Hollow Metal Doors and Frames."
   2. Overhead Doors: As specified in Division 08 Section "Overhead Coiling Doors."
   3. Door Hardware: To be coordinated with Owner (NIC).

B. Swinging Personnel Doors and Frames: Metal building system manufacturer's standard doors and frames; prepared and reinforced at strike and at hinges to receive factory- and field-applied hardware according to BHMA A156 Series.

1. Exterior Hollow Metal Doors: Provide all exterior doors as part of PEMB package, including doors located in walls with metal siding and concrete masonry.
    a. General: Zinc-Iron Alloy-Coated galvannealed steel, ASTM A 653, Class A60. Close tops of doors to eliminate moisture penetration.
        1) Thickness: 16 gage.
        2) Performance: Level A (Heavy Duty), Full Flush.
        3) Door Level: 3, high impact, high frequency of use.
        4) Thickness: 1-3/4 inches.
        5) Thermal Performance:
    b. Internal construction:
        1) Insulation: ASTM C 591; Foamed in place polyurethane foam, not greater than one-half (1/2) of an inch void in any one direction, U-value of 0.11 minimum.
        2) Vertical Stiffeners: Minimum 20-gauge stiffeners.
    c. Glazing: At locations indicated in Door Schedule.
        1) 5/8-inch factory installed, tempered gas-filled insulated glazing, sealed trim with factory weatherproof gasket.
        2) Thermal performance: SHGC .37, U-Factor .25 BTU/hr*FT^2, Shading Coefficient (SC) .42.
        3) Fire Rating: Supply door units bearing Manufacturer labels for fire ratings indicated in Door Schedule.
        4) Glazing color: Clear.
    d. Hardware reinforcements:
        1) Hinge reinforcements for full mortise hinges minimum 7 gage, galvannealed.
        2) Lock reinforcements: minimum sixteen 16 gauge, galvannealed.
        3) Closer reinforcements: minimum 14 gauge, galvannealed.
        4) Reinforce top and bottom of doors with 14 gauge, galvannealed metal welded to both panels.
            a) Fire rated doors: Supply door units bearing Manufacturer labels for fire ratings indicated in Door Schedule.
            b) Accessories: Provide one-way, peep-holes as indicated in Door Schedule.
2. Hollow Metal Frames:
    a. Exterior frames:
        1) Basis of Design: CecoDoor ‘Series SQW’.
        2) Thickness: 16 gage.
        3) Fabricate frames with mitered or coped corners.
        4) Fabricate frames as a full profile welded unless otherwise indicated.
        5) Provide foam filled compression weather stripping in kerf pocket.
        6) Size: 5-1/2”.
    b. Frame Anchors.
        1) Masonry: ‘T’ jamb anchors for grout-filled frames anchored to concrete masonry units.
        2) Metal stud framing: ‘Z’ tab-anchors for metal stud framed openings.
3. Finish: Factory finished multi-coat system color as indicated on finish schedule.
    a. Primer: Factory primer suitable for application of exterior-grade urethane topcoats meeting ANSI A224.1 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.”
    b. Topcoat: Two component high solid urethane.
        1) Basis of Design Product: ‘PPG Spectracron 360 Series 2K HS’ Exterior Grade Urethane.
        2) Sheen: High Gloss.

3) Hardener: Use finish manufacturer recommended catalyzed exterior hardener.
4) Hardness: Pencil H-2H.
5) Application: Factory spray applied for smooth, blemish free finish.
6) Dry film build: 1.5-2.5 mils.
7) Gloss: 15-25@60-degree angle per ASTM D523
8) Humidity Resistance: No rust, blisters or delamination per ASTM D2247.
9) Salt Spray Resistance: <3-5 mm creepage; no blisters or delamination per ASTM D2247 with 500-1000 hour life.

C. ELECTRIFIED DOORS AND FRAMES
1. General: Provide pre-wired electrified doors and frames at locations indicated on Door Schedule.
2. Door and Frame materials: See Section 2.08 Doors and Frames for materials.
3. Doors: All doors required for the application of electronic locks, remote monitoring, which require the door to have wires through the door shall be provided.
a. Wiring: 22-gauge multi-strand wire using internal door conduit.
b. Junction Box Location and Type: Junction boxes at middle hinge reinforcement to accommodate electric hinge and a junction box at the strike location to accommodate an electric strike.
4. Frames:
a. Provide all hollow metal frames receiving electrified hardware through-frame wiring harness and concealed plug connectors on each end to accommodate up to twelve wires.
b. Coordinate connectors on each end of the wiring harness to plug directly into the electrified hardware and the electric hinge.

2.10 TRANSLUCENT PANELS

A. Translucent Single Panel Standing Seam Cladding System: Polycarbonate panel with cell extrusion; complying with ASTM E330, Grade 1 (weather resistant); smooth finish on both sides.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Kingspan Light + Air, Pentaglas or a comparable product.
2. Wall Panel Weight: Not less than .53 lb/sq. ft.
3. Thickness: 16 mm.
4. Width: 24 inches nominal.
5. Metal Edge: Fabricate full length of each side of panel with metal edge for seaming into standing-seam roof panel joint.
6. Color: As selected by Architect from manufacturer's full range.

B. Performance:
1. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
a. Flame-Spread Index: 25 or less, class A rating.
b. Smoke-Developed Index: 450 or less.
c. U-Factor: NFRC 100 0.43 to 0.38 center of glass.
d. Water Penetration ASTM E331, Air Infiltration ASTM E283.

2.11 SKYLIGHTS

A. See Division 08 Section "Unit Skylights."

2.12 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
   2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
   3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
   4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
   6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch standoff; fabricated from extruded polystyrene.

C. Roof Snow Guards: Complete snow retention system with standing seam rib mounted clamps and 2-piece horizontal pole snow-retention assembly manufactured out of of aluminum, stainless steel, or roofing color-match PVDF coated material. Subject to compliance with requirements, basis of design products that may be incorporated in the Work include the following:
   1. Ace Clamp – ‘A2 N Thee-Rail Heavy Duty Snow Guard System’ with double lock install. www.aceclamp.com.
   2. Alpine Snow Guards – ‘2000 T-2K’ – www.alpinesnowguards.com.
   3. S-5 – ‘DualGuard’ – www.s-5.com.
   4. Or Approved Equal.

D. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

E. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 22 gauge, 0.025-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
   1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
   2. Opening Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 22 gauge, 0.025-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

F. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 22 gauge, 0.025-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 20-foot-long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
   1. Gutter Supports: Fabricated from same material and finish as gutters.
   2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

G. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 22 gauge, 0.025-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot-long sections, complete with formed elbows and offsets.
   1. Mounting Straps: Fabricated from same material and finish as gutters.

H. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness prepainted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.
   1. Curb Subframing: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.060-inch nominal uncoated steel thickness, angle-C-, or Z-shaped metallic-coated steel sheet.
   2. Insulation: 1-inch-thick, rigid type.

I. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

J. Materials:
   1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating. Only supply products suitable for installation application as approved by roofing and siding manufacturer.
      a. Clips for Concealed Fastener Metal Roof Panels: Seamed standard clips mounted to bearing plates approved by metal roofing manufacturer for installation and warranty of roof system. Provide protection against galvanic action at dissimilar materials.
      b. Fasteners for Metal Roof Panels: Self-drilling, self tapping, zinc-alloy-steel hex washer head, coated for protection against corrosion, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
      c. Fasteners for Metal Wall Panels: Color matched to wall panels, self-drilling, self tapping, zinc-alloy-steel hex washer head, with EPDM sealing washers bearing on weather side of metal panels.
      d. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head. Screws must be coated for protection against corrosion.
      e. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time, minimum compressive strength of 5,000 psi at column bases.
4. Metal Panel Sealants:
    a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
    b. Joint Sealant: ASTM C920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.13 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
1. Make shop connections by welding or by using high-strength bolts.
2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
1. Make shop connections by welding or by using non-high-strength bolts.
2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.14 SOURCE QUALITY CONTROL

A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.
   1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.
      a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
   1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

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

3.03 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.

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

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Steel Joists[and Joist Girders]: Install joists[, girders,] and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.
1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Joist Installation: Bolt joists to supporting steel framework using carbon-steel bolts unless otherwise indicated.
5. Joist Installation: Bolt joists to supporting steel framework using high-strength structural bolts unless otherwise indicated. Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for high-strength structural bolt installation and tightening requirements.
6. Joist Installation: Weld joist seats to supporting steel framework.
7. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.04 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
   1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
      a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
   2. Install metal panels perpendicular to structural supports unless otherwise indicated.
   3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Locate metal panel splices over structural supports with end laps in alignment.
   6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

E. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
   1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.

F. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
   1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
   2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.05 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
   1. Install ridge[and hip] caps as metal roof panel work proceeds.
   2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
   1. Install clips to supports with self-drilling or self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
   4. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
   5. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
   6. Provide metal closures at peaks rake edges and each side of ridge caps.

C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.06 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
   2. Shim or otherwise plumb substrates receiving metal wall panels.
   3. When two rows of metal panels are required, lap panels 4 inches minimum.
   4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
   5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
   6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
   7. Install screw fasteners in predrilled holes.
   8. Install flashing and trim as metal wall panel work proceeds.
   9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
   10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.

11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.07 TRANSLUCENT PANEL INSTALLATION

A. Translucent Panels: Attach translucent panels to structural framing with fasteners according to manufacturer's written instructions. Install panels perpendicular to supports unless otherwise indicated. Anchor translucent panels securely in place, with provisions for thermal and structural movement.
1. Installs must be performed by installers certified by panel manufacturer.
2. Use only recommended fasteners, screws, etc., level, straight, etc. to allow movement.
   a. Allow for expansion and contraction of 1/4” for each 10’ of panel.
3. Install the panel with the UV protection facing the sun. An arrow on the side of the glazing should point outward.
4. Panel end must be fixed into the proper framing without excessive stresses, deformation or twisting.
5. Remove the protective film from glazing immediately upon installation to avoid melting the film to the panel.

3.08 METAL SOFFIT PANEL INSTALLATION

A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.

B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.09 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.
4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:
1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal roof panels fastened to secondary framing.
2. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.

3. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.
    a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
4. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
    a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
5. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
2. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

3.10 DOOR AND FRAME INSTALLATION

A. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturers' written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

B. Personnel Doors and Frames: Install doors and frames according to NAAMM-HMMA 840. Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
1. Between Doors and Frames at Jambs and Head: 1/8 inch.
2. Between Edges of Pairs of Doors: 1/8 inch.
3. At Door Sills with Threshold: 3/8 inch.
4. At Door Sills without Threshold: 3/4 inch.
5. At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

C. Field Glazing: Comply with installation requirements in Section 088000 "Glazing."

D. Door Hardware:
1. Install surface-mounted items after finishes have been completed at heights indicated in DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
4. Set thresholds for exterior doors in full bed of sealant complying with requirements for concealed mastics specified in Section 079200 "Joint Sealants."

3.11 SKYLIGHT INSTALLATION

A. See Division 08 Section "Unit Skylights."

3.12 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
   1. Provide elbows at base of downspouts to direct water away from building.
   2. Tie downspouts to underground drainage system indicated.

E. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.

F. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.13 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.14 ADJUSTING

A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

C. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and at weather stripping to ensure smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.15 CLEANING AND PROTECTION

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

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing[, bearing plates,] and accessories.
   1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

D. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
   1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.
   1. Immediately before final inspection, remove protective wrappings from doors and frames.

G. Windows: Clean metal surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Clean factory-glazed glass immediately after installing windows.

3.16 FINISH SCHEDULE

A. General: Finish color selection to be made by Project Representative from approved manufacturer's standard range in color noted below. Finish coating system is indicated within product information.

B. Finish Schedule:

1. MATERIAL OR COMPONENT	COLOR
Roof Panels:	To be selected by Architect.
Wall Panel, Type 1	
Wall Panel, Type 1A	
Wall Panel, Type 2	
Soffit	To be selected by Architect.
Trim and Fascia	Match color of adjacent panel surface.
Louvers, Vents, Wall Accessories, and Roof Accessories	Match color of adjacent panel surface.
Metal Doors & Frames Exposed to Exterior, finish all sides.	Match siding color:
Primary Structural Steel	
Steel Less Than 16-Gauge Thickness	No color, hot dipped galvanized.

END OF SECTION 13 3419