THE SAMARITAN HOUSE
OF ORANGEBURG COUNTY, INC.

PROJECT MANUAL

for

CAFETERIA & MULTIPURPOSE

1580 MIDDLETON ST.
ORANGEBURG, SOUTH CAROLINA 29115

Architects Project Number: 2026017.00

Prepared by:

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ARCHITECTURE
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September 22, 2026

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1.2. RELATED DOCUMENTS

A. Document 01 10 00 - Summary.

B. Document 00 41 00 - Bid Form.

C. Document 00 43 23 - Alternates Form.

INVITATION

2.1. BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received at the office of The Samaritan House of Orangeburg County, Inc. at 1580 Middleton St., Orangeburg, SC 29115 before 11:00 a.m. local standard time on Tuesday 10-20-2026.
   1. Bids must be sealed, dropped off, and time-stamped. Bids can be received between the hours of 9:00 a.m. and 3:00 p.m., Monday through Friday, and no later than the time and date noted above.

B. Offers submitted after the above time will be rejected.

C. Offers will be opened at 11:00 a.m. on the 20 th day of October, 2026, at the office of The Samaritan House of Orangeburg County, Inc..

2.2. INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete project named Samaritan House - Cafeteria & Multipurpose for a Stipulated Sum contract, in accordance with Contract Documents.

2.3. WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises building construction, including general construction, structural, mechanical, electrical, and site/civil improvements. Work.

B. Project Location:
1580 Middleton St..
Orangeburg, SC 29115.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.1. DEFINITIONS

A. Bid Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form, Alternates Form identified.

B. Bid, Offer, or Bidding: Act of submitting an offer under seal.

C. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

3.2. CONTRACT DOCUMENTS IDENTIFICATION

A. Contract Documents are identified as Owner's Kitchen Renovation & Multipurpose Room Project as prepared by Architect, and with contents as identified in the Table of Contents.

3.3. AVAILABILITY

A. Bid Documents may be obtained at the office of Architect, by email kholdorf@beckermorgan.com

B. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

3.4. EXAMINATION

A. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.

B. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

3.5. INQUIRIES/ADDENDA

A. Direct questions to the Office of the Architect, email; kholdorf@beckermorgan.com.

B. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount.

C. Verbal answers are not binding on any party.

3.6. PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

A. General Requirements for Substitution Requests:
   1. Project Manual establishes standards for products, assemblies, and systems.
   2. Submit requests only for elements for which substitution is specifically allowed in the Project Manual.
   3. Provide sufficient information to determine acceptability of proposed substitutions.
   4. Provide complete information on required revisions to other work to accommodate each proposed substitution.

SITE ASSESSMENT

4.1. SITE EXAMINATION

A. Examine the project site before submitting a bid.

B. The bidder is required to contact Owner at the following address and phone number in order to arrange a date and time to visit the project site: Mr. Henry Miller, 803-809-1090 x101, email:hmiller@samaritanhouseorangeburgsc.org.

4.2. PREBID CONFERENCE

A. A mandatory bidders conference has been scheduled for 10:00 a.m. on the 29th day of September, 2026 at the location of 1580 Middleton St., Orangeburg, SC 29115.

B. All general contract bidders and suppliers are invited.

QUALIFICATIONS

5.1. SUBCONTRACTORS/SUPPLIERS/OTHERS

A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

BID SUBMISSION

6.1. SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.

B. Physical Document Submissons:
   1. Submit one copy of executed offer, signed and sealed, on Bid Forms provided. Use an opaque envelope, clearly identified with bidder's name, project name, and Owner's name on the outside.

BID ENCLOSURES/REQUIREMENTS

7.1. BID FORM SIGNATURE

A. The Bid Form shall be signed by the bidder, as follows:
   1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.

7.2. ADDITIONAL BID INFORMATION

A. Submit the following Supplements concurrent with bid submission:
   1. Document 00 43 23 - Alternates Form: Include the cost variation to the Bid Amount applicable to the Work described in Section _____.

7.3. SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate Alternates as a difference in bid price by adding to or deducting from the base bid price.

B. Bids will be evaluated on the total of the base bid price and all of the Alternates. After determination of the successful bidder, consideration will be given to which Alternates will be included in the Work.

OFFER ACCEPTANCE/REJECTION

8.1. DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date.

8.2. ACCEPTANCE OF OFFER

A. Owner reserves the right to accept or reject any or all offers.

B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Bid Acceptance.

END OF SECTION

SECTION 00 41 00 - BID FORM

THE PROJECT AND THE PARTIES

1.1. FOR:

A. The Samaritan House of Orangeburg County, Inc.

B. Project: Samaritan House - Cafeteria & Multipurpose

C. Owner
1580 Middleton St.
Orangeburg, South Carolina29115

1.2. DATE: _____ (BIDDER TO ENTER DATE)

1.3. SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

A. Bidder's Full Name _____
1. Address _____
2. City, State, Zip_____

1.4. OFFER

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Becker Morgan Group for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

B. _____
_____ dollars
($_____), in lawful money of the United States of America.

1.5. ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

1.6. BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

H. _____

I. (Authorized signing officer, Title)

END OF SECTION

SECTION 00 43 23 - ALTERNATES FORM

PARTICULARS

1.1. THE FOLLOWING IS THE LIST OF ALTERNATES REFERENCED IN THE BID SUBMITTED BY:

1.2. (BIDDER) _____

1.3. TO (OWNER): THE SAMARITAN HOUSE OF ORANGEBURG

1.4. DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

ALTERNATES LIST

2.1. THE FOLLOWING AMOUNTS SHALL BE ADDED TO OR DEDUCTED FROM THE BID AMOUNT. REFER TO SECTION 01 23 00 - ALTERNATES.

ALTERNATE # A: ADD $ _____

ALTERNATE # B: ADD $ _____

ALTERNATE # C: ADD $ _____

ALTERNATE # D: ADD $ _____

ALTERNATE # E: (DEDUCT) $ _____

END OF SECTION

SECTION 00 50 00 - CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.1. AGREEMENT AND CONDITIONS OF THE CONTRACT

A. The Agreement is based on AIA A101.

B. The General Conditions are based on AIA A201.

1.2. FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents, or as otherwise stipulated by Owner

B. Bond Forms:
   1. Bid Bond Form: AIA A310.
   2. Performance and Payment Bond Form: AIA A312.

C. Post-Award Certificates and Other Forms:
   1. Schedule of Values Form: AIA G703.
   2. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

D. Clarification and Modification Forms:
   1. Architect's Supplemental Instructions Form: AIA G710.
   2. Construction Change Directive Form: AIA G714.
   3. Change Order Form: AIA G701.

E. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.

1.3. REFERENCE STANDARDS

A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2017.

B. AIA A201 - General Conditions of the Contract for Construction; 2017.

C. AIA A310 - Bid Bond; 2010.

D. AIA A312 - Performance Bond and Payment Bond; 2010.

E. AIA G701 - Change Order; 2017.

F. AIA G702 - Application and Certificate for Payment; 1992.

G. AIA G703 - Continuation Sheet; 1992.

H. AIA G704 - Certificate of Substantial Completion; 2017.

I. AIA G710 - Architect's Supplemental Instructions; 2017.

J. AIA G714 - Construction Change Directive; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 10 00 - SUMMARY

PART 1 GENERAL

1.1. PROJECT

A. Project Name: Samaritan House - Cafeteria & Multipurpose

B. Owner's Name: Samaritan House of Orangeburg, South Carolina, .

C. Architect's Name: Becker Morgan Group

D. The Project consists of the construction of New construction of a 1 story, 2,300 sf light wood framed (Type VB) free standing building to support the existing facility to provide additional multipurpose (assembly) space. Scope also includes renovations to the existing kitchen (within existing building), site work related to new free standing building and design alternates as outlined on Sheet G001 and front end documents..

1.2. CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 50 00 - Contracting Forms and Supplements.

1.3. DESCRIPTION OF ALTERATIONS WORK

A. Scope of alterations work is indicated on drawings.

B. Owner will remove the following items before start of work:
1. Existing storage building as located at rear of existing site..

1.4. WORK BY OWNER

A. Existing Building Demolition: Owner will contract for demolition of the existing structure on site and removal of its foundations. The site will be backfilled at the removed foundations and filled to existing grade elevation. Work will be completed prior to anticipated start of construction.

1.5. OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.6. CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.
1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

C. Existing building spaces may not be used for storage.

D. Utility Outages and Shutdown:
   1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
   2. Prevent accidental disruption of utility services to other facilities.

1.7. WORK SEQUENCE

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.2. SCHEDULE OF VALUES

A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values in duplicate within 20 days after date of Owner-Contractor Agreement.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.3. APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

D. Forms filled out by hand will not be accepted.

E. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Balance to Finish.
   9. Retainage.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

I. Submit electronic copy of each Application for Payment.

J. Include the following with the application:
1. Transmittal letter as specified for submittals in Section 01 30 00.
2. Partial release of liens from major subcontractors and vendors.
3. Affidavits attesting to off-site stored products.

K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.4. MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.

D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

E. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
   a. Quantities of products, labor, and equipment.
   b. Taxes, insurance, and bonds.
   c. Overhead and profit.
   d. Justification for any change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.
   b. Dates and times work was performed, and by whom.
   c. Time records and wage rates paid.

d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

1.5. APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00 - ALLOWANCES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Contingency allowance.

1.2. RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.3. CONTINGENCY ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

B. Funds will be drawn from the Contingency Allowance only by Change Order.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4. ALLOWANCES SCHEDULE

A. Contingency Allowance: Include the stipulated sum/price of $75,000 for use upon Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00 - ALTERNATES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Description of Alternates.

B. Procedures for pricing Alternates.

C. Documentation of changes to Contract Price and Contract Time.

1.2. RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

B. Document 00 43 23 - Alternates Form: List of Alternates as supplement to Bid Form.

C. Document 00 52 00 - Agreement Form: Incorporating monetary value of accepted Alternates.

1.3. ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.4. SCHEDULE OF ALTERNATES

A. Alternate No. A - ACOUSTIC WALL PANELS: ADD
   1. Base Bid Item: No wall acoustic wall paneling, See A701, gyp. board & paint wall finish.
   2. Alternate Item: Section 98430 and Drawing number A701A/B/C including to add acoustic wall panels.

B. Alternate No. B - CERAMIC WALL TILES: ADD
   1. Base Bid Item: No ceramic wall tile, See A401, similar.
   2. Alternate Item: Section 093000 and Drawing number A701A/B/C including to add ceramic wall tiles.

C. Alternate No. C - EPOXY FLOORING: ADD
   1. Base Bid Item: No expoxy flooring, sealed concrete, see A402.
   2. Alternate Item: Section 096700 and Drawing number A402C including to add epoxy flooring in Warming Kitchen and both Unisex Toilets.

D. Alternate No. D - EXISTING KITCHEN RENOVATIONS, COMPLETE, INCLUDING: ARCHITECTURAL and MEP SCOPE: ADD

E. Alternate No. E: REMOVE BRICK VENEER WATER TABLE & BRICK VENEER COLUMNS AS SHOWN ON CORNERS OF ELEVATIONS 1 & 2 SHEET A201: DEDUCT

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.2. RELATED REQUIREMENTS

A. Section 00 21 13 - Instructions to Bidders: Restrictions on timing of substitution requests.

B. Section 01 23 00 - Alternates, for product alternatives affecting this section.

C. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.

1.3. DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1. GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
   4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   5. Waives claims for additional costs or time extension that may subsequently become apparent.
   6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. No specific form is required. Contractor's Substitution Request documentation must include the following:
      a. Project Information:
         1) Official project name and number, and any additional required identifiers established in Contract Documents.
         2) Owner's, Architect's, and Contractor's names.
      b. Substitution Request Information:
         1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
         2) Indication of whether the substitution is for cause or convenience.
         3) Issue date.
         4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
         5) Description of Substitution.
         6) Reason why the specified item cannot be provided.
         7) Differences between proposed substitution and specified item.
         8) Description of how proposed substitution affects other parts of work.
      c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
         1) Physical characteristics.
         2) In-service performance.
         3) Other salient features and requirements.
         4) Include, as appropriate or requested, the following types of documentation:
            a) Product Data:
            b) Samples.
            c) Certificates, test, reports or similar qualification data.
            d) Drawings, when required to show impact on adjacent construction elements.
      d. Impact of Substitution:
         1) Savings to Owner for accepting substitution.
         2) Change to Contract Time due to accepting substitution.

D. Limit each request to a single proposed substitution item.
   1. Submit an electronic document, combining the request form with supporting data into single document.

3.2. SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:
   1. Owner will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.

3.3. SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Architect will consider requests for substitutions only within 30 days after date of Agreement.

B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

C. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
3. Bear the costs engendered by proposed substitution of:
    a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.

D. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
2. Without a separate written request.

3.4. RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.

3.5. ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6. CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. General administrative requirements.

B. Preconstruction meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Progress photographs.

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

G. Number of copies of submittals.

H. Requests for Interpretation (RFI) procedures.

I. Submittal procedures.

1.2. RELATED REQUIREMENTS

A. Section 01 60 00 - Product Requirements: General product requirements.

1.3. GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:
1. Requests for Interpretation (RFI).
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1. PRECONSTRUCTION MEETING

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

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

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
5. Submission of initial Submittal schedule.
6. Designation of personnel representing the parties to Contract and Architect.
7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.

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

3.2. PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly and /or monthly intervals.

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

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

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

3.3. CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.

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

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

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

E. Submit updated schedule with each Application for Payment.

3.4. PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.

C. Photography Type: Digital; electronic files.

D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.

E. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Completion of site clearing.
   2. Foundations in progress and upon completion.
   3. Structural framing in progress and upon completion.
   4. Enclosure of building, upon completion.
   5. Final completion, minimum of ten (10) photos.

F. Views:
   1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
   2. Consult with Architect for instructions on views required.
   3. Provide factual presentation.
   4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
   4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.5. REQUESTS FOR INTERPRETATION (RFI)

A. Definition: A request seeking one of the following:
   1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed;

or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.

B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item.
      a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
      b. Do not forward requests which solely require internal coordination between subcontractors.
   2. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
   1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
   2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
      a. Approval of submittals (use procedures specified elsewhere in this section).
      b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
      c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
   3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
   4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

D. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

E. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.
   3. Highlight items requiring priority or expedited response.
   4. Highlight items for which a timely response has not been received to date.

F. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 3:00 PM will be considered as having been received on the following regular working day.
   1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

G. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
   1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
   2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
   3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
   4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.6. SUBMITTALS FOR REVIEW

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

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

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

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.7. SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

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

3.8. NUMBER OF COPIES OF SUBMITTALS

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

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

3.9. SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a separate transmittal for each item.
   2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
   3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
   4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.

a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.

6. Schedule submittals to expedite the Project, and coordinate submission of related items.
   a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
   b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
7. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
8. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
9. Submittals not requested will not be recognized or processed.

B. Product Data Procedures:
1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

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

D. Samples Procedures:
1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.10. SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
   a. "Approved", or language with same legal meaning.
   b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
   c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
2. Not Authorizing fabrication, delivery, and installation:

E. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
   a. "Received" - to notify the Contractor that the submittal has been received for record only.

2. Items for which action was taken:
   a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.2. SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule.

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

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

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

E. Submit updated schedule with each Application for Payment.

F. Submit in PDF format.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1. PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2. CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

C. Provide legend for symbols and abbreviations used.

3.3. BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

3.4. REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5. UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Mock-ups.

G. Manufacturers' field services.

H. Defect Assessment.

1.2. REFERENCE STANDARDS

A. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2025.

1.3. DEFINITIONS

A. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

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

1.5. QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6. REFERENCES AND STANDARDS

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

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

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

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

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

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

1.7. TESTING AND INSPECTION AGENCIES AND SERVICES

A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

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

C. Contractor Employed Agency:

PART 3 EXECUTION

2.1. CONTROL OF INSTALLATION

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

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

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

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

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

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

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

2.2. MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

C. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

D. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

E. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

2.3. TESTING AND INSPECTION

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

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

C. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
    a. To provide access to Work to be tested/inspected.
    b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    c. To facilitate tests/inspections.
    d. To provide storage and curing of test samples.
4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

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

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

2.4. MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

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

2.5. DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

C. Temporary Controls: enclosures and fencing.

D. Vehicular access and parking.

E. Waste removal facilities and services.

F. Project identification sign.

1.2. RELATED REQUIREMENTS

A. Section 01 51 00 - Temporary Utilities.

B. Section 01 55 00 - Vehicular Access and Parking.

1.3. TEMPORARY UTILITIES - SEE SECTION 01 51 00

1.4. TEMPORARY SANITARY FACILITIES

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

B. Maintain daily in clean and sanitary condition.

1.5. FENCING

A. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.6. VEHICULAR ACCESS AND PARKING - SEE SECTION 01 55 00

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

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

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

D. Existing parking areas located at existing site; upper lot may be used for construction parking.

1.7. WASTE REMOVAL

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

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

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

1.8. PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on drawings.

B. Erect on site at location indicated.

C. No other signs are allowed without Owner permission except those required by law.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00 - TEMPORARY UTILITIES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Temporary Utilities: Provision of electricity and water.

1.2. TEMPORARY ELECTRICITY

A. Cost: By Owner.

B. Provide power service required from utility source.

C. Power Service Characteristics: 120/208 volt, 800 (new work) / 600 (existing) ampere, three phase, four wire.

D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.

E. Provide main service disconnect and over-current protection at convenient location and meter.

F. Permanent convenience receptacles may be utilized during construction.

G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.3. TEMPORARY WATER SERVICE

A. Cost of Water Used: By Contractor.

B. Connect to existing water source.
   1. Exercise measures to conserve water.

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 55 00 - VEHICULAR ACCESS AND PARKING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Parking.

B. Existing pavements and parking areas.

C. Permanent pavements and parking facilities.

D. Construction parking controls.

E. Maintenance.

F. Removal, repair.

PART 2 PRODUCTS

2.1. MATERIALS

A. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

PART 3 EXECUTION

3.1. PREPARATION

A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2. PARKING

A. Use of designated areas of existing parking facilities by construction personnel is permitted.

3.3. PERMANENT PAVEMENTS AND PARKING FACILITIES

A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.

3.4. CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

3.5. MAINTENANCE

A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.

B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.6. REMOVAL, REPAIR

A. Repair existing facilities damaged by use, to original condition.

B. Repair damage caused by installation.

END OF SECTION

SECTION 01 57 13 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

END OF SECTION

SECTION 01 58 13 - TEMPORARY PROJECT SIGNAGE

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Project identification sign.

1.2. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizes and grades of members.

PART 2 PRODUCTS

2.1. SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch (19 mm) thick, standard large sizes to minimize joints.

C. Rough Hardware: Galvanized.

2.2. PROJECT IDENTIFICATION SIGN

A. One painted sign, 48 sq ft (4.5 sq m) area, bottom 6 feet (2 m) above ground.

B. Graphic Design, Colors, Style of Lettering: Designated by Architect.

PART 3 EXECUTION

3.1. INSTALLATION

A. Install project identification sign within 30 days after date fixed by Notice to Proceed.

B. Erect at designated location.

C. Install sign surface plumb and level, with butt joints. Anchor securely.

3.2. REMOVAL

A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2. RELATED REQUIREMENTS

A. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

B. Section 01 40 00 - Quality Requirements: Product quality monitoring.

C. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3. SUBMITTALS

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

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

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1. EXISTING PRODUCTS

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

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

2.2. NEW PRODUCTS

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

2.3. PRODUCT OPTIONS

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

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

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

D. Products Specified as Basis-of-Design: Submit substitution requests for unnamed products to Architect for evaluation.

2.4. MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1. SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.2. TRANSPORTATION AND HANDLING

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

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

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

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

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

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

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

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

3.3. STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.

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

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

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

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

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

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

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

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

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

END OF SECTION

SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

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

1.2. RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

B. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

C. Section 01 50 00 - Temporary Facilities and Controls: Temporary interior partitions.

1.3. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
1. On request, submit documentation verifying accuracy of survey work.
2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.

1.4. QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.5. PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Perform dewatering activities, as required, for the duration of the project.

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

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

G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

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

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.6. COORDINATION

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

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

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

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

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

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

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

PART 2 PRODUCTS

2.1. PATCHING MATERIALS

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

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

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

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

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

3.2. PREPARATION

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

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3. PREINSTALLATION MEETINGS

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

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

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

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

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

3.4. LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.5. GENERAL INSTALLATION REQUIREMENTS

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

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

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

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

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

3.6. ALTERATIONS

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

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

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

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

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

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

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

I. Clean existing systems and equipment.

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

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

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

3.7. CUTTING AND PATCHING

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

B. See Alterations article above for additional requirements.

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

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

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

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

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

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

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

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

3.8. PROGRESS CLEANING

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

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

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

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

3.9. PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

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

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

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

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

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

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

3.10. SYSTEM STARTUP

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

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

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

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

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

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

3.11. DEMONSTRATION AND INSTRUCTION

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

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

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.12. ADJUSTING

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

3.13. FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

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

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

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

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

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

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

3.14. CLOSEOUT PROCEDURES

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

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

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

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

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

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

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

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

END OF SECTION

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1. WASTE MANAGEMENT REQUIREMENTS

A. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

B. Contractor Reporting Responsibilities: Submit periodic Waste Disposal Reports; report landfill disposal, incineration, recycling, salvage, and reuse regardless of to whom the cost or savings accrues; use the same units of measure on required reports.

C. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

D. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2. RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3. DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS

2.1. PRODUCT SUBSTITUTIONS

A. See Section 01 60 00 and Section 01 25 00.

PART 3 EXECUTION

3.1. WASTE MANAGEMENT PROCEDURES

A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2. WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

1. Provide containers as required.
2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

B. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

C. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

D. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

E. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

1.2. RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.3. SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1. PROJECT RECORD DOCUMENTS

A. Ensure entries are complete and accurate, enabling future reference by Owner.

B. Store record documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Record Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.2. OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3. OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4. OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.5. WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 02 41 00 - DEMOLITION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Selective demolition of built site elements.

C. Selective demolition of building elements for alteration purposes.

D. Abandonment in place of existing utilities and utility structures.

1.2. RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Sequencing and staging requirements.

C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 57 13 - Temporary Erosion and Sediment Control.

E. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

F. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

G. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

H. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal; earth stripping and stockpiling.

I. Section 31 22 00 - Grading: Rough and fine grading.

J. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

K. Section 32 91 19 - Landscape Grading: Topsoil placement and finish grading.

L. Section 32 93 00 - Plants: Relocation of existing trees, shrubs, and other plants.

1.3. DEFINITIONS

A. Demolish: Dismantle, raze, destroy, or wreck any building or structure or any part thereof.

B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.

C. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4. REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2027.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Site Plan: Indicate:
1. Vegetation to be protected.
2. Areas for temporary construction and field offices.
3. Areas for temporary and permanent placement of removed materials.

C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
1. Indicate extent of demolition, removal sequencing, bracing and shoring, and location and construction of barricades and fences.
2. Summary of safety procedures.
3. Demolition firm qualifications.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.6. QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
1. Minimum of 3-5 years of documented experience.

PART 2 PRODUCTS

2.1. MATERIALS

A. Fill Material: See Section 31 23 23.

PART 3 EXECUTION

3.1. DEMOLITION

A. Remove portions of existing buildings in the following sequence:
1. EXIST. KITCHEN (INTERIORS AS PER DRAWINGS).

B. Remove other items indicated, for SCOPE OF WORK.

C. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 22 00.

3.2. GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with requirements in Section 01 70 00.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
1. Obtain required permits.

2. Comply with applicable requirements of NFPA 241.
3. Use of explosives is not permitted.
4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.

F. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

G. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.3. EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4. SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
1. Verify construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from areas that remain occupied.
1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 .

C. Remove existing work as indicated and required to accomplish new work.
1. Remove items indicated on drawings.

D. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
1. Prevent movement of structure. Provide shoring and bracing as required.
2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch to match new work.

3.5. DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 01 00 - MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Cleaning of existing concrete surfaces.

B. Repair of exposed structural, shrinkage, and settlement cracks.

C. Resurfacing of concrete surfaces having spalled areas and other damage.

D. Scope of Work: As indicated on drawings.

1.2. RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.3. PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.

B. Repair Surface: By the square foot (meter). Includes surface preparation, repair, finishing.

C. Preparation for Resurfacing: By the square yard (meter). Includes surface preparation, cleaning.

1.4. REFERENCE STANDARDS

A. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2024.

B. ASTM D3039/D3039M - Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials; 2017 (Reapproved 2025).

C. ICC-ES AC178 - Acceptance Criteria for Inspection and Verification of Concrete and Reinforced and Unreinforced Masonry Strengthening Using Fiber-Reinforced Polymer (FRP) or Steel-Reinforced Polymer (SRP) Composite Systems; 2017, with Editorial Revision (2020).

D. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

C. Shop Drawings for Applied Composite Repairs: Provide shop drawings signed and sealed by Professional Engineer indicating:
   1. Repair location.
   2. Repair details.

3. Fiber type, dimensions, number, thickness, and direction of layers.
4. Installation sequence.
5. Splice details.
6. Joint and end details.
7. Anchorage.
8. Connections.

D. Manufacturer's instructions.

E. Field quality control submittals.

F. Field quality control submittals for CFRP.

G. Designer's qualification statement.

H. Manufacturer's qualification statement.

I. Cleaner's qualification statement.

J. Installer's qualification statement.

K. Project Record Documents: Accurately record actual locations of structural reinforcement repairs and type of repair.

1.6. QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Cleaner Qualifications: Company specializing in, and with minimum of 3 years of experience in, the type of cleaning specified.

D. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

B. Deliver polymer resin materials in original factory-sealed containers with manufacturer's labels intact and legible. Verify product nomenclature, manufacturer's name, product identification, batch number, date of manufacture, and shelf life or expiration date. Do not use polymer resin materials that have exceeded shelf life.

C. Store materials in covered, well-ventilated area and according to manufacturer's written storage instructions. Store polymer resins and hardeners separate from construction materials that can absorb odors.

PART 2 PRODUCTS

2.1. CLEANING MATERIALS

A. Degreaser:
1. Manufacturers:

a. Euclid Chemical Company; Euco Clean and Strip: www.euclidchemical.com/#sle.
b. Nox-Crete, Inc; Bio-Clean Plus: www.nox-crete.com/#sle.
c. SpecChem, LLC; Orange Peel-Citrus Cleaner: www.specchemllc.com/#sle.
d. W. R. Meadows, Inc; ULTRITE: www.wrmeadows.com/#sle.
e. Substitutions: See Section 01 60 00 - Product Requirements.

B. Detergent: Non-ionic detergent.

2.2. CEMENTITIOUS PATCHING AND REPAIR MATERIALS

A. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
2. Mapei Corporation; MAPECEM QUICKPATCH: www.mapei.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Bonding Slurry: Water-based latex admixture; comply with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
1. Admixture Manufacturers:
a. Euclid Chemical Company; AKKRO-7T: www.euclidchemical.com/#sle.
b. W. R. Meadows, Inc; Acry-lok: www.wrmeadows.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
1. Manufacturers:
a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
b. Mapei Corporation; Mapecem Quickpatch: www.mapei.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
1. Manufacturers:
a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
b. Mapei Corporation; Planitop 18 TG: www.mapei.com/#sle.
c. Mapei Corporation; Planitop X: www.mapei.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. ACCESSORIES

A. Water: Clean and potable.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.2. PREPARATION

A. Prepare concrete surfaces to be repaired according to ICRI 310.2R, _____.

3.3. CLEANING EXISTING CONCRETE

A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.

B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
   1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
   2. Clean out cracks and voids using same methods.

C. The following are acceptable cleaning methods, in order from gentlest to less gentle:
   1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
   2. Increasing the water washing pressure to maximum of 400 psi.
   3. Adding detergent to washing water; with final water rinse to remove residual detergent.
   4. Steam-generated low-pressure hot-water washing.

D. Do not use any of the following cleaning methods, unless otherwise indicated:
   1. Brushes with wire bristles, grinding with abrasives, solvents, hydrochloric or muriatic acid, sodium hydroxide, caustic soda, or lye.
   2. Soap or detergent that is not non-ionic.
   3. Alkaline cleaning agents.
   4. Acidic cleaning agents.
   5. Abrasive blasting.

3.4. CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.

B. Follow bonding agent and repair mortar manufacturer's written installation instructions.

C. Apply coating of bonding agent to entire concrete surface to be repaired.

D. Fill voids with cementitious mortar flush with surface.

E. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch (6 mm) over entire surface, terminating at a vertical change in plane on all sides.

F. Trowel finish to match adjacent concrete surfaces.

G. Damp cure for four days.

3.5. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. An independent testing agency, as specified in Section 01 40 00, will perform field inspection and testing.
   1. Test concrete for calcium chloride content during the execution of the Work.
   2. Field Quality Control for CFRP:
      a. Inspect installation and test for compliance with ICC-ES AC178.
      b. Inspect for voids, bubbles, and delaminations by performing a visual and acoustic tap test of layered surface after 24 hours of initial resin saturant cure.
      c. Test for material properties of CFRP in accordance with ASTM D3039/D3039M.

d. Nonconforming Work: Repair defective work after minimum cure time for CFRP laminates.

END OF SECTION

SECTION 03 05 16 - UNDERSLAB VAPOR BARRIER - W. R. MEADOWS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Underslab vapor barrier at concrete slabs on grade.

1.2. RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 20 00 - Concrete Reinforcing.

C. Section 03 30 00 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.3. REFERENCE STANDARDS

A. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2024.

B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data on manufactured products.

C. Test Reports: Submit report of tests showing compliance with specified requirements.

D. Manufacturer's Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.1. MATERIALS

A. Underslab Vapor Barrier:
   1. Water Vapor Permeance: Not more than 0.010 perm (0.6 ng/Pa s sq m).
   2. Complying with ASTM E1745 Class A.
   3. Thickness: 20 mils, 0.020 inch (0.51 mm).
   4. Product:
      a. W. R. Meadows, Inc; Perminator 15-Mil Underslab Vapor Barrier: www.wrmeadows.com/#sle.
      b. Substitutions: Not permitted.

B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify vapor barrier substrate is complete and prepared in accordance with manufacturer's recommendations before proceeding with installation of vapor barrier.

3.2. INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.

B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.

C. Lap joints minimum 6 inches (150 mm).

D. Seal joints, seams, and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.

E. Do not allow penetration of vapor barrier, except for reinforcing steel and permanent utilities.

F. Repair damaged vapor retarder before covering with other materials.

END OF SECTION

SECTION 03 30 00
CAST- IN- PLACE CONCRETE

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

DESCRIPTION OF WORK

Furnish and install all materials, labor and equipment necessary to properly perform all concrete work required as specified herein and/or shown on the drawings. To include all concrete, metal reinforcing, and finishes.

Related Items of Work: Particular attention is directed to the drawings and other construction documents, and to the contract documents, for information pertaining to required items of work which are related to and usually associated with the work of this section of the Project Manual, but which are to be provided as part of the work of other sections of the Project Manual. Install dovetail anchor strips which are furnished under Division 4 Unit Masonry Assemblies.

Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:

ACI 301 "Specifications for Structural Concrete for Buildings."

ACI 311 "Recommended Practice for Concrete Inspection."

ACI 318 "Building Code Requirements for Reinforced Concrete."

ACI 347 "Recommended Practice for Concrete Formwork."

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

Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

WORKMANSHIP

The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the Architect.

SUBMITTALS

Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, and others as requested by Architect.

Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.

Materials Certificates: Provide certification from admixture manufacturers that chloride content complies with specification requirements.

Shop Drawings for Formwork Indicating Fabrication and Erection of Forms for Specific Finished Concrete Surfaces: Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.

Architects review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractors responsibility.

PRODUCTS

FORM MATERIALS

Forms for Exposed Finish Concrete:

1. Unless otherwise shown, construct all formwork for exposed concrete surfaces with high density overlay boards, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion, nor impede wetting of surfaces to be cured with water or curing compound.

Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to surface.

2. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.

REINFORCING MATERIALS

Reinforcing Steel Bars: ASTM A-615; Grade 60, deformed.

Steel Wire: ASTM A-82, plain, cold-drawn steel.

Welded Wire Fabric: ASTM A-185, welded steel wire fabric.

Supports for Reinforcement:

3. Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise specified. Wood, brick and other devices will not be acceptable.
4. For slabs on grade, use supports with sand plates, horizontal runners, or concrete brick as approved by Architect where wetted base materials will not support chair legs. Do not use concrete brick if not acceptable to local building official.
5. For exposed to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot-dip galvanized, or plastic protected, or stainless steel protected.

CONCRETE MATERIALS

Portland Cement: ASTM C-150, type 1, unless otherwise acceptable to Architect.

Fly Ash: ASTM C-618, Type F or C.

Aggregates:

6. Fine and coarse aggregate: Conform to ASTM Designation C-33. Provide coarse aggregate to conform to the following size limitations.
7. Nominal maximum size of coarse aggregate shall not be larger than 1/5 of narrowest dimensions between sides of forms, 1/3 of depth of slabs, nor 3/4 of minimum clear distance between reinforcing bars or between bars and forms, whichever is least.
8. Coarse aggregates may be of one size for all concrete placed in one day when quantities to be placed are too small to permit economical use of more than one mix design. When a single mix design is so used, maximum nominal size shall be as required for most critical condition of concreting in accordance with paragraph above.
9. Fine and Coarse Aggregate (For Lightweight Concrete): "Fines" shall conform to ASTM Designation C33 for fine (sand) aggregate; remainder of lightweight aggregate shall conform to ASTM Designation C330, sized and graded to

conform to applicable provisions of ACI Standard Recommended Practice for Selecting Proportions for Structural Lightweight Concrete (ACI 613A); and to provide design strength requirements as established by laboratory design mix test. Maximum weight per cubic foot shall be five pounds greater for each required strength than required under provisions of ASTM C330. Lightweight aggregate vendor shall provide advisory engineering services as necessary during concreting operations.

Water: Clean, fresh, drinkable.

Air-Entraining Admixture: ASTM C-260.

Water-Reducing Admixture: ASTM C-494, Type A.

High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C-494, Type F or Type G.

Set-Control Admixtures: ASTM C-494, as follows:

10. Type B, Retarding.
11. Type C, Accelerating.
12. Type D, Water-reducing and Retarding.
13. Type E, Water-reducing and Accelerating.

Calcium chloride will not be permitted in concrete.

Shrinkage Reducing Admixture: For all interior concrete slabs, this project, use Eclipse Floor Shrinkage Reducing Admixture by Grace Construction Products. Apply at a dosage recommended by manufacturer (printed instructions). Do not use in exterior concrete with air-entraining admixtures.

GROUT FOR STEEL BEARING PLATES

See Section 05120.

RELATED MATERIALS

Preformed Expansion Joint Fillers: Provide closed-cell synthetic rubber joint filler.

Expansion joint material: ASTM D1056-2C.1

Joint Sealing Compound: Provide polyurethane-sealant (see Section 07920.)

Vapor Barrier: Provide vapor barrier cover over prepared base material below slabs on grade. Use materials which are resistant to decay when tested in accordance with ASTM E 154. Membrane must have the following qualities: (a) minimum permeance of 0.001 Perms per ASTM E 96; (b) meet or exceed Class A per ASTM E 1745 and (c) not less than 15 mils thick. Acceptable products include Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC; Vapor Guard by Griffolyn and Premolded Membrane by W. R. Meadows.

Vapor Barrier Accessories: Seam Tape shall be high density polyethylene with pressure sensitive adhesive. Minimum width shall be 4". Seam tape shall be of type recommended by the vapor barrier manufacturer.

Granular Base: Evenly graded mixture of number 789 crushed stone or an evenly graded mixture of granular sand (less than 5% shall pass a 200 sieve) aggregate to provide when compacted a smooth and even surface below slabs on grade.

Moisture-Retaining Cover: One of the following, complying with ASTM C-171:

a. Waterproof paper.
b. Polyethylene film.
c. Polyethylene-coated burlap.

Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

14. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
15. Products: Subject to compliance with requirements, provide one of the following:
    a. "Surfhard"; Euclid Chemical Co.
    b. "Lapidolith"; Sonneborn-Rexnord.
    c. "Saniseal"; Master Builders.

Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.555 gr./sq. cm. when applied at 200 sq. ft./gal.

Underlayment Compound: Freeflowing, self-leveling, pumpable cementitious base compound. Provide one of the following or approved equal: (1) "Flo-Top" - Euclid Chemical Co., (2) AConflow@ - Conspec, (3) "Thoro Underlayment Self-Leveling" - Thoro System Products

Bonding Agent: "Euco Weld" by Euclid, "Thorobond" by Standard Dry Wall, AStrongbond@ by Conspec, "Weldcrete" by Larsen, or approved equal.

Patching Mortar: "Poly-Patch" by the Euclid Chemical Company, "Thorocrete" by Standard Dry Wall, "Sonopatch" by Sonneborn, ASpecial Patch@ by Conspec, or approved equal

Epoxy Joint Filler: "Euco Epoxy No. 700" by the Euclid Chemical Company, "Sikadur Lo-Mod Mortar" by Sika Chemical Corp., ASpec Joint CJ@ by Conspec, or approved equa

Structural Patching Mortar: 100% solids compound. AEUCO Epoxy No. 456, No. 456LV, or No. 460 Mortar@ by the Euclid Chemical Company; AColma DUR Mortar or LV Mortar@ or ASikadue Lo-Mod Mortar@ by Sika Chemical Corp., or approved equal

Waterstop: Provide Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, by Voclay or approved equal hydrophilic material for adhesive bonding to concrete. Provide manufacturer's standard waterstop fittings, adhesives and accessories. At Contractor's option: provide flat, dumbbell type or centerbulb type waterstops at construction joints and other joints as indicated. Size to suit joints. Provide D6-14 dumbbell, R6-316 ribbed, or RB6-316HR ribbed with center bulb, all by Vinylex Corporation, No. 6316 ribbed with center bulb by W. R. Meadows, Inc., DB-2 dumbbell, No. 13 serrated, or No. 4 serrated with center bulb, all by W. R. Grace & Company, No. 8015 ribbed with center bulb or No. 8027 dumbbell by AMICO, or approved equal. Provide manufacturer's standard waterstop fittings, adhesives, and accessori

Crack Filler: If crack repairs in concrete slabs become necessary under the following terms, use crack-fill 4 made by Metzger/Mcguire (follow the manufacturer's recommendations). Inspect the floor after 90 days, and repair any crack that is more than 1/32" wide

PROPORTIONING AND DESIGN OF MIXES

Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing. Limit use of fly ash to not exceed 25 percent of cement content by weight.

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

Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

16. Regular Weight (150 PCF): Based upon 28 days psi compressive strength requirements, provide concrete having compressive strength of 3000 psi for all concrete footings, and miscellaneous concrete.
17. Regular Weight (150 PCF): Based upon 28 days psi compressive strength requirements, provide concrete having compressive strength of 4000 psi for all framed concrete beams, columns, slabs, concrete walls, and slab-on-grade.
18. Light Weight (116 PCF): Based on 28 days psi compressive strength requirements, provide concrete having compressive strength of 3500 psi at 28 days. (For all elevated structural slab concrete placed on metal decking.)

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

COMPRESSIVE PROPORTIONS AND CONSISTENCY

Intent of specifications is to secure, for every part of work, structural concrete of homogeneous structure which, when hardened, will have required strength and resistance to weathering.

All concrete shall have water-reducing type chemical, admix at place of mixing. Amount of chemical admix per each bag of cement used shall be in strict accordance with manufacturer's recommendations as related to temperature, humidity, and wind conditions prevailing at site at time of pouring, and dependent upon type of admixture being used.

Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

19. Subjected to freezing and thawing; W/C 0.40.

Volumetric proportioning not allowable. Measurement of materials shall be by weight only and by methods that will permit proportions to be accurately controlled and easily checked at any time during work operations.

The use of calcium chloride in concrete is prohibited.

Use air-entraining admixture in exterior exposed concrete, unless otherwise shown or specified. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the following limits:

20. Concrete structures and slabs exposed to freezing and thawings or subjected to hydraulic pressure:
    a. 6% for maximum 3/4-inch aggregate.
    b. 7% for maximum 1/2-inch aggregate.

Use super plasticizer in concrete for all slab construction. Also use in all pumped concrete and as required for placement and workability.

SLUMP LIMITS

Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows: (Slump may be increased when chemical admixtures are used, provided that the admixture-treated concrete has the same or lower water/cement or water/cementitious material ratio and does not exhibit segregation potential or excessive bleeding.) Concrete mix shall indicate slump without chemical admixtures and with chemical admixtures,

21. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
22. Reinforced foundation systems: Not less than 1 inch and not more than 4 inches.
23. Concrete containing HRWR admixture (super-plasticizer): Not more than 8 inches after addition of HRWR to site-verified 2 inches - 3 inches slump concrete.
24. Other concrete: Not less than 1 inch nor more than 4 inches.

CONCRETE MIXING - READY-MIX CONCRETE

Comply with the requirements of ASTM C-94, and as herein specified.

Delete the references for allowing additional water to be added to the batch for material with insufficient slump. Addition of water to the batch **will not** be permitted.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C-94 may be required.

When the air temperature is between 85 degrees F and 90 degrees F, reduce the mixing and delivery time from 1-1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F, reduce the mixing and delivery time to 60 minutes.

EXECUTION

FORMS

Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms complying with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required on work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste. Install dovetail anchor strips which are furnished under Division 4 Unit Masonry Assemblies.

Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Place temporary openings on forms at inconspicuous locations.

Chamfer all exposed corners and edges as directed by Architect if not shown, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

Form Ties:

25. Factory-fabricated, adjustable-length, removable or snap off metal ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
26. Unless otherwise shown, provide ties so portion remaining within concrete after removal is at least 1-1/2 inches inside concrete.
27. Unless otherwise shown, provide form ties which will not leave holes larger than 1 inch diameter in concrete surface.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such ties. Accurately place and securely support items built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Re-tighten forms after concrete placement if required to eliminate mortar leaks.

Vapor Retarder Installation:

B. Following leveling and tamping of base for slabs on grade, place vapor barrier sheeting with longest dimension parallel with direction of pour.

The vapor barrier shall be installed to form a continuous sheet across the entire building footprint. Joints shall be overlapped a minimum of 6 inches.

Overlapping joints in the vapor barrier shall be sealed by mechanical fastening in accordance with manufacturer's instructions. Joints should be sealed a 39 inch maximum intervals using 0.5 inch long washer-head, self-tapping galvanized screws and allowing the head of the screw to bed into the adhesive compound. Four-inch wide, Preprufe Tape shall be applied over all overlapping joints to seal screw heads.

Where pipes, columns or other objects penetrate the vapor barrier, it shall be cut and sealed to the pipe, column or penetration using Bituthene Liquid Membrane. Sealant shall be applied in accordance with manufacturer's directions.

Punctures or tears in the vapor barrier membrane shall be repaired with Preprufe Tape or compatible material.

Deal vapor barrier membrane to foundation walls or grade beams at building perimeter using approved sealant.

Avoid extended traffic over vapor barrier to prevent punctures or tears in the vapor barrier membrane.

Where voids between foundation wall and slab edge are accessible, these joints shall be sealed in order to reduce vapor entry.

Vapor Barrier shall be installed in strict accordance with the manufacturer's requirements.

UNDERSLAB FILL (GRANULAR BASE)

Place under slab fill over entire area of sub grade in interior of building. Place elsewhere as prerequired by the Contract Documents. Tamp and compact under slab-fill until thoroughly compacted to a minimum compacted thickness of 4 inches.

CONCRETE WORK TOLERANCES:

Except when close coordination and fitting of various trades' work precludes allowances of tolerances, maximum total permissible deviations from established lines, grades, and dimensions shall be as stated hereinbelow. Set and maintain forms in such a manner as to ensure completed work within specified tolerance limits. (See Monolithic Slab Finish For Concrete Slab Tolerances.)

1. Variation from the plumb:
   a. In lines and surfaces of columns, piers, and in arrises, in 10 feet: 1/4 inch.
   b. For exposed corner columns, control-joint grooves and other conspicuous lines in any bay or 20-foot maximum: 1/4 inch.
2. Variations from the level or from indicated qrades:
   a. In structural concrete ceiling, beam soffits, and in arrises, in 10 feet: 1/4 inch.
   b. For exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, in any bay or 20-foot maximum: 1/4 inch.
3. Variations of the linear building lines from established position in plan and related position of columns, walls, and partitions in any bay or 20-foot maximum: 1/4 inch.
4. Variations in sizes and locations of sleeves, floor openings, and wall openings: 1/4 inch.
5. Variations in cross-sectional dimensions of columns and beams and in thickness of walls: 1/4 inch.
6. Variations in footings:
   a. Variation in dimensions in plan: Minus 1/2 inch; Plus 2 inches (applies to concrete only - not to reinforcing bars or dowels).
   b. Misplacement or eccentricity: 2 percent of footing width in direction of misplacement, but not more than 2 inches. (Concrete only.)
7. Reduction in thickness: Minus 5 percent of specified thickness.
8. Variation in steps: In a flight of stairs:
   a. Rise: 1/8 inch.
   b. Tread: 1/4 inch.

PLACING REINFORCEMENT

Comply with the specified codes and standards, the Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified. Avoid cutting or puncturing vapor retarder during reinforcing placement and concreting operations.

Clean reinforcement of loose rust and mill scale, soil, ice and other materials which reduce or destroy bond with concrete.

Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

Place reinforcement to obtain at least the minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcements in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

Do not place reinforcing bars more than 2 inches beyond the last leg of continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

Do not splice reinforcement at points of maximum stress. At points where bars lap or splice, including distribution steel, provide sufficient lap to transfer stress between bars by bond and shear. Stagger splices in adjacent bars. Lap splices in piers, struts, sufficiently to transfer full stress by bond.

Protect metal reinforcement by thickness of concrete indicated. Where not otherwise shown, thickness of concrete over reinforcement shall be as follows:

9. Where concrete is deposited against ground without use of forms: not less than 3 inches.
10. Where concrete is exposed to weather, or exposed to ground but placed in forms: not less than 2 inches for bars more than 5/8 inch in diameter and 1-1/2 inch for bars 5/8 inch or less in diameter.
11. In slabs and walls not exposed to ground: not less than 3/4 inch.
12. In all cases, thickness of concrete over reinforcement shall be at least equal to diameter of bars.

Position all reinforcement accurately. Secure at intersections with annealed wire ties or bar clips. Support with metal supports, spacers, or hangers of approved type. Metal supports (for reinforcing) that are placed directly against horizontal forms, shall have plastic-coated legs wherever the finished concrete surfaces will be exposed in the completed work, and wherever the finished concrete surfaces are to receive any type of directly-applied finish material which could be subject to damage due to stain from rusting of non-plastic-coated materials.

Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction. Arrange runways over slabs to avoid traffic directly on mesh during pouring operations. Rolled wire shall be straightened into flat sheets before being placed.

JOINTS

Construction Joints:

13. Locate and install construction joints, which are not shown on the drawings, so as not to impair the strength and appearance of the structure, as acceptable to the Architect. Locations to be approved by Architect.

14. Provide keyways at least 1-1/2 inches deep in all construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
15. Place construction joints perpendicular to the main reinforcement. Continue all reinforcement across construction joints, except as otherwise indicated.

Isolation Joints in Slabs-On-Ground:

16. Construction isolation joints in slabs-on-ground at all points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

Joint filler and sealant materials are specified in this section and Division 7 of this Project Manual.

Contraction (Control) Joints in Slabs-on-Ground and Framed Structural Slabs: Construct contraction joints in slabs-on-ground and framed slab as indicated on drawings.

If joint pattern not shown for slab-on-grade, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

INSTALLATION OF EMBEDDED ITEMS

General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto. No aluminum conduit or inserts shall be embedded in concrete.

Install dovetail anchor strips which are furnished under Division 4 Unit Masonry Assemblies. Provide with temporary filler and set vertically at 16" o.c. maximum.

Install reglets to receive top edge of foundation sheet waterproofing, and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds. Set screeds for composite slab at girder lines to produce "flat" slab.

If, in the judgment of the Engineer, embedded items are located or grouped in a manner that will weaken the structure, the Contractor shall take necessary corrective steps.

CONCRETE PLACEMENT

Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.

Moisten wood forms immediately before placing concrete where form coatings are not used.

General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

17. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

18. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
19. Do not use vibrators to transport concrete inside forms.

Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

20. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
21. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
22. Maintain reinforcing in proper position during concrete placement operations.
23. Compensate for steel beam deflection during concrete placement by providing thicker slab to provide "flat" slab surface.

Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

24. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27 degrees C) at point of placement.
25. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
26. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

27. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
28. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

FINISH OF FORMED SURFACES

Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, veneer plaster, painting, or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

Smooth Rubbed Finish:

29. Provide smooth rubbed finish to exposed surfaces and to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.
30. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

Repair of Surface Defects: After forms are removed, any concrete that obviously has been improperly formed or is out of alignment or level beyond required tolerances, or which shows a defective surface that cannot be satisfactorily repaired or patched, shall be removed.

MONOLITHIC SLAB FINISHES

Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerances for floor flatness (FF) of 18 and floor levelness (FL) of 15. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.

Float Finish: Apply float finish to monolithic slab surface to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of

power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of FF 20 - FL 18. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

Trowel Finish:

31. Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating, system.
32. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of FF 25 - FL 20. Grind smooth surface defects which would telegraph through applied floor covering system.

Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, driveways, walks, and ramps, and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

Chemical-Hardener Finish:

33. Apply chemical-hardener finish to all interior exposed concrete floors. See plans for other indicated areas. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.
34. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.
35. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

CONCRETE CURING AND PROTECTION

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

36. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
37. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

Curing Methods: Water cure concrete slabs that are to receive a terrazzo topping. For other concrete perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

38. Provide moisture curing by following methods.
    a. Keep concrete surface continuously wet by covering with water.
    b. Continuous water-fog spray.
    c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
39. Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape of adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
40. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs, as follows: Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
41. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp proofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials.
42. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
43. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
44. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
45. Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

REMOVAL OF FORMS

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 4 days after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days.

MISCELLANEOUS CONCRETE ITEMS

Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

Reinforced Masonry: Provide 3000 psi concrete grout for reinforced masonry cells, masonry lintels, and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement. See general notes on structural drawings for additional requirements.

Concrete Stairs:

46. Screed and tamp wearing surfaces of treads, landing, and platforms to force fines to surface. Do not dust to remove excess water. Screed and wood float to smooth, level surface. As soon as surface becomes workable, steel trowel to smooth, hard, impervious, polished finish. Work nosing edges carefully to provide extra lines and profiles as required.
47. Add nonslip aggregate to treads, landings, and platforms when such surfaces are not covered with other materials. Apply nonslip aggregate per manufacturer’s direction, using 25 pounds per 100 square feet.
48. Give formed surfaces of risers, stringers, etc., a surface treatment as hereinbefore specified for other non-wearing concrete surfaces, after forms are removed.

Cement Finish Fill for Metal Stairs:

49. Provide wire mesh reinforcement and cement fill for treads and platforms of metal stairs.
50. Fill composition: 1 part Portland cement, 1 part coarse sand, 1-3/4 parts pea gravel ranging from 1/8 to 3/8 inch in graduation of sizes. Reinforcing Mesh: 2 inches x 2 inches by 14 gauge.
51. Clean metal surfaces of dirt, oil, grime, etc. Install one layer of cement fill to approximate one-half depth and, while plastic, install layer of mesh of size equivalent to full area of surface, immediately followed by remainder of fill.
52. Tamp fill to force fines to surface. As soon as surface is workable, steel trowel to smooth, level, hard polished finish. Cover with clean sand and keep sand wet constantly for minimum of 7 days. Remove sand and protect surfaces until building is accepted.

53. In addition to metal nosings provided under another section of this Project Manual, apply specified non-slip aggregate to wearing surfaces per manufacturer's directions, using 25 pounds per 100 square feet. Non-slip aggregate not required when treads are to receive resilient coverings.

CONCRETE SURFACE REPAIRS

Patching Defective Areas:

54. Repair and patch defective areas with cement mortar immediately after removal of forms, but only when acceptable to Architect.
55. Cut out honeycomb, rock pockets, voids over 1/2 inch in diameter, and holes left by tie-rods and bolts, down to solid concrete, but in no case to a depth of less than 1 inch. Make edge of cuts perpendicular to the concrete surface. Before placing cement mortar, thoroughly clean, dampen with water and brush-coat the area to be patched with neat cement grout. Proprietary patching compounds may be used when acceptable to Architect.
56. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color of surroundings.
57. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

Repair of Formed Surfaces:

58. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets and holes left by tie-rods and bolts; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning.
59. Repair concealed formed surfaces where possible, that contain defects that adversely affect the durability of the concrete. If defects cannot be repaired, remove and replace the concrete.

Repair of Unformed Surfaces:

60. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surface sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
61. Repair finished unformed surfaces that contain defects which adversely affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01 inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
62. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
63. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh

concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

64. Repair defective areas except random cracks and single holes not exceeding 1 inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete, and brush with a neat cement grout coating or concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of same materials to provide concrete of the same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
65. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout coating. Place dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.
66. CRACK REPAIR-CRACK FILLER: Use Crack-Fill 4 made by Metzger/McGuire. Inspect the floor after 90 days, and repair any crack that is more than 1/32" wide. Repair cracks by filling with Crack-Fill 4. Follow the manufacturer's recommendations.
67. Repair methods not specified above may be used, subject to acceptance of Architect.
68. Perform structural repairs with prior approval of Architect or Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.

QUALITY CONTROL TESTING DURING CONSTRUCTION

The testing agency performing the concrete sample tests shall be the Owner’s agent. The testing agency will distribute reports to the Owner, Architect, Engineer(s) and Program Manager only. No reports will be sent to the Contractor alone or through the Contractor.

Sampling and testing for quality control during placement of concrete includes the following:

69. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
70. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
71. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
72. Concrete Temperature: Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens made.
73. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store

cylinders for laboratory cured test specimens except when field-cure test specimens are required.

74. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
    a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
    b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
    c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests.

CLEAN-UP

Immediately after completion of concrete operations, remove from site all debris resulting from work.

Immediately prior to final inspection, preliminary to acceptance, wash and clean all exterior concrete wearing surfaces and interior uncovered wearing surfaces. Leave all concrete in clean, acceptable condition.

END OF SECTION 03 30 00

SECTION 03 35 11 - CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Surface treatments.

B. Liquid densifiers and hardeners.

C. Low-gloss sealer.

1.2. RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

B. Section 03 30 00 - Cast-in-Place Concrete: Curing compounds that also function as sealers.

C. Section 09 67 00 - Fluid-Applied Flooring.

D. Section 09 96 00 - High-Performance Coatings.

1.3. ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with concrete floor placement and concrete floor curing.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for preparation of substrate, application of finishing products, and requirements for polishing and protection of finished surface.

D. Manufacturer's qualification statement.

E. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

F. Specimen warranty.

G. Executed warranty.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.7. FIELD CONDITIONS

A. Maintain light level equivalent to a minimum 200 W light source at 8 feet (2.5 m) above the floor surface over each 20 foot (6 m) square area of floor being finished.

B. Do not finish floors until interior heating system is operational.

C. Maintain ambient temperature of 50 degrees F (10 degrees C) minimum.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide two-year manufacturer warranty for _____ commencing on the Date of Substantial Completion.

C. Finish Warranty: Provide five-year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

D. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1. APPLICATIONS

A. Unless otherwise indicated on drawings, finish concrete floors using troweling aid, densifier, and curing agent.

2.2. SURFACE TREATMENTS

A. Troweling Aid, Densifier and Curing Agent: Liquid reactive colloidal silica-based topical treatment, spray-applied to wet concrete and floated or troweled into the surface.
1. Product:
a. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. DENSIFIERS AND HARDENERS

A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores, hardening, and dustproofing.
1. Composition: Lithium silicate, with siliconate.
2. Products:
a. Substitutions: See Section 01 60 00 - Product Requirements.

2.4. COATINGS

A. Low-Gloss or Matte Clear Coating: Transparent, nonyellowing, acrylic-polymer-based coating.
1. Composition: Water-based urethane.
a. Products:
1) Substitutions: See Section 01 60 00 - Product Requirements.

2. Composition: One-component water-based acrylic film-forming sealer.
   a. Nonvolatile Content: 28 percent, minimum, when measured by volume.
   b. Products:
      1) Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that floor surfaces are acceptable to receive the work of this section.

B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.2. GENERAL

A. Apply materials in accordance with manufacturer's instructions.

3.3. COATING APPLICATION

A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.

B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.

C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

D. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

3.4. PROTECTION

A. Protect installed coatings from subsequent construction operations.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 35 43 - POLISHED CONCRETE FINISHING - CURECRETE

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Polished concrete system.

1.2. RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Curing and finishing concrete surface.

B. Section 07 92 00 - Joint Sealants.

1.3. DEFINITIONS

A. Distinctness of Image (DOI) Gloss: Sharpness or clarity of images produced by reflection from polished surface.

B. Haze: Cloudiness of images produced by reflection from polished surface.

1.4. REFERENCE STANDARDS

A. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ANSI/NFSI B101.1 - Test Method for Measuring the Wet SCOF of Hard-Surface Walkways; 2022.

D. ANSI/NFSI B101.3 - Test Method for Measuring the Wet DCOF of Hard Surface Walkways; 2022.

E. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2025.

F. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces; 2019.

G. ASTM C805/C805M - Standard Test Method for Rebound Number of Hardened Concrete; 2025.

H. ASTM D4039 - Standard Test Method for Reflection Haze of High-Gloss Surfaces; 2009 (Reapproved 2023).

I. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces; 2018 (Reapproved 2023).

J. ASTM E1155/E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2023.

1.5. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene one week before starting work of this section; require attendance by affected installers; review preparation and installation procedures and coordination of related work.

B. Sequencing: Comply with manufacturer's recommendations for sequencing construction operations. Ensure other trades are aware of sequencing and protection required before, during, and after polished concrete finish installation.

1.6. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets for each type of product indicated.

C. Certificate: Certify products of this section meet or exceed specified requirements.

D. Test Reports: Provide certified test reports from independent testing laboratory showing compliance with performance requirements and physical properties.

E. Manufacturer's Instructions: Indicate installation, joint filling, crack repair, and surface repair. Provide technical bulletins, specifications, and data sheets.

F. Manufacturer's qualification statement.

G. Testing agency's qualification statement.

H. Operation and Maintenance Data: Provide manufacturer's manual indicating maintenance and renewal of applied treatments.

I. Executed warranty.

1.7. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

C. Documents at Project Site: Maintain at project site one copy of manufacturer's instructions, erection drawings, and shop drawings.

1.8. MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Conduct on-site mock-up directly on jobsite floor area under conditions similar to final finish conditions of project.
   1. Size: 10 by 10 feet (3 by 3 meters).
   2. Divide mock-up area into four equal zones; allow for sequential application attempts to determine amount of aggregate exposure, color selection, and shine selection.
   3. Allow 24 hours before Architect inspects mock-up. Do not proceed with work until Architect completes inspection.

C. Approved mock-up determines required standard of quality, including workmanship, substrate preparation, equipment operation, material application, color, and shine.

D. Mock-up may not remain as part of work.

1.9. DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements.

C. Deliver materials to project site in original, unbroken packages bearing manufacturer's labels and seals.

D. Protect materials from exposure to harmful weather conditions.

E. Store materials in temperature conditions recommended by manufacturer.

F. Protect concrete slab substrate as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic lifts and power equipment.
3. Place drop cloths under vehicles parked on slab and restrict general vehicular parking.
4. Do not use pipe-cutting machinery over floor slabs.
5. Do not place steel on floor slab that can leech rust stains onto concrete.
6. Do not allow acids or acidic detergents to contact slab.

1.10. FIELD CONDITIONS

A. Ambient Conditions: Do not install polished concrete system when ambient conditions exceed manufacturer's recommended limits.

1.11. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 10-year manufacturer warranty for polished concrete system. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Curecrete Distribution, Inc; RetroPlate System: www.curecrete.com/#sle.

B. Prosoco; CONSOLIDECK.

C. Euclid Chemical; ULTRASIL LI+ & ULTRAGUARD.

D. Substitutions: See Section 01 60 00 - Product Requirements.

E. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.

2.2. PERFORMANCE REQUIREMENTS

A. Comply with national, state, and local VOC regulations.

B. Comply with ADA Standards.

C. Static Coefficient of Friction: Minimum 0.5 when tested in accordance with ANSI/NFSI B101.1.

D. Dynamic Coefficient of Friction: Minimum 0.5 when tested in accordance with ANSI/NFSI B101.3.

E. Abrasion Resistance: Maximum 400 percent increase in abrasion resistance when tested in accordance with ASTM C779/C779M.

F. Reflectivity: Increase of 35 percent as determined by gloss meter.

G. Impact Strength: Maximum 21 percent increase in impact strength after application when tested in accordance with ASTM C805/C805M.

H. Health Product Declaration: Complete, published declaration with full disclosure of known hazards.

I. Concrete Performance before Polishing:
   1. Hardened Concrete Properties:
      a. Minimum Concrete Compressive Strength: 3,500 psi (24.1 MPa).
      b. Normal Weight Concrete: Do not use lightweight concrete aggregates.
      c. Provide non-air-entrained concrete.
   2. Placement Properties for New Concrete:
      a. Maximum Slump: 4-1/2 inches (114 mm).
   3. Floor Flatness (Ff):
      a. Local Ff: 35 when tested in accordance with ASTM E1155/E1155M.
      b. Overall Ff: 50 when tested in accordance with ASTM E1155/E1155M.
   4. Hard-Steel Troweled Concrete, Three Passes: Finish floor in accordance with ACI PRC-302.1, Class 5, with no burn marks.
   5. Curing Options: Provide membrane-forming curing compounds complying with ASTM C309, Type 1, Class B; resin or dissipating curing.
   6. Damp Curing: Seven-day cure.
   7. Penetrating Cure:
      a. Product: Curecrete Distribution, Inc; Ashford Formula.

2.3. POLISHED CONCRETE SYSTEM

A. Components:
   1. Hardener, Sealer, and Densifier: Penetrating, water-based, odorless liquid complying with industry-standard VOC requirements; does not leave film on surface.
      a. Product: Curecrete Distribution, Inc; RetroPlate 99.
   2. Concrete Clarity Enhancer and Grinding Accelerant:
      a. Product: Curecrete Distribution, Inc; KickStart.
   3. Joint Filler: Semi-rigid, moisture-insensitive, two-component, self-leveling, 100-percent solids, rapid-curing polyurea joint and crack filler.
      a. Hardness: 65, Shore A.
      b. Product: Curecrete Distribution, Inc; CreteFill Pro 85.
   4. Oil-Repelling Sealer: Prevents oil and water from penetrating floor and causing whitening.
      a. Product: Curecrete Distribution, Inc; RetroPel.
   5. Stain Protection: Topical coating, protecting against staining by preventing immediate damage to floor surface and increasing window of opportunity for cleanup.
      a. Product: Curecrete Distribution, Inc; RetroGuard.
   6. Transparent Concrete Dye: Topically applied.
      a. Color: As selected by Architect from manufacturer's standard range.
      b. Product: Curecrete Distribution, Inc; RetroPlate Concrete Dye Concentrate.
   7. Cleaning Solution: Designed to clean densified and densified-polished concrete floors.
      a. Product: Curecrete Distribution, Inc; CreteClean Plus.

B. ASCC Concrete Polishing Council Aggregate Appearance Classification:
   1. Class B, Fine Aggregate: Salt and pepper finish.
      a. Composition: 85 to 95 percent fine aggregate; 5 to 15 percent blend of cement fines and coarse aggregate.

C. ASCC Concrete Polishing Council Polished Concrete Appearance Levels:
   1. Level 3, Polished: Easily identifiable reflections, though not necessarily sharp and crisp.
      a. Polish: 400- to 800-grit.
      b. DOI Reading: 40 to 69, when tested in accordance with ASTM D5767.
      c. Haze Reading: 10, maximum, when tested in accordance with ASTM D4039.
      d. Reflective Sheen: Medium to high.

PART 3 EXECUTION

3.1. EXAMINATION

A. Test for concrete flatness in accordance with ASTM E1155/E1155M before installing polished concrete system.

B. Verification of Conditions:
   1. Examine surface to determine soundness of concrete surface for polishing.
   2. Verify concrete substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.
   3. Verify floor surface is free of coatings, sealants, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
   4. Verify joint filling and patching of concrete flaws. See Section 07 92 00.
   5. Allow complete curing before application of concrete hardener and densifier.

3.2. PREPARATION

A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.

B. Concrete Slab Curing: See Section 03 30 00.

3.3. INSTALLATION

A. Perform work of this section before installing fixtures and accessories.

B. Floor Surface Polishing and Treatment:
   1. Provide densified and polished concrete floor treatment on entirety of slab as indicated on drawings and in accordance with manufacturer's instructions.
   2. Provide consistent finish in connected areas of application to achieve specified appearance classifications and appearance levels.
   3. Diamond-polish concrete floor surfaces as recommended by polishing system manufacturer's representative.
      a. Comply with manufacturer's recommended polishing grit for each sequence. Ensure shine level matches approved mock-up.
      b. Maintain uniformity of appearance for concrete surfaces.
   4. Apply hardener and densifier in accordance with the following:
      a. Apply at 200 sq ft/gal (4.9 sq m/L) in accordance with manufacturer's instructions.
      b. Apply sealers and coatings in accordance with manufacturer's instructions.

3.4. REPAIR

A. Defective Concrete: Repair or replace concrete not complying with required lines, details, dimensions, tolerances, or specified requirements at no additional cost to Owner.

B. Remove finishing defects and repolish affected areas.

3.5. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Test in accordance with ASTM D5767 for DOI and ASTM D4039 for haze.
   1. Perform minimum of three tests for each polished area of work up to 1,000 sq ft (93 sq m) in size. Distribute tests across areas.

C. Nonconforming Work: Repair nonconforming work and retest until work complies with specified requirements.

D. Manufacturer Services: Provide services of manufacturer's field representative to inspect and approve installation method.

3.6. CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Mechanically scrub treated floors once per day for seven days after installation in accordance with manufacturer's instructions.

C. Remove rubbish, tools, equipment, and excess materials.

3.7. PROTECTION

A. Protect polished floor in accordance with manufacturer's instructions.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 01 00 - MAINTENANCE OF MASONRY

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Water cleaning of EXISTING AND NEW MASONRY surfaces.

B. Repointing mortar joints.

C. Repair of damaged masonry.

1.2. RELATED REQUIREMENTS

A. Section 04 05 11 - Masonry Mortaring and Grouting.

B. Section 04 20 00 - Unit Masonry: Brick masonry units.

C. Section 04 20 00 - Unit Masonry: Mortar and grout.

1.3. PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.

B. Repointing: By the square foot (square meter). Includes N/A.

1.4. REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.5. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
   1. Require attendance of parties directly affecting work of this section.

1.6. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Instructions: For cleaning materials, indicate special procedures, conditions requiring special attention.

1.7. QUALITY ASSURANCE - MASONRY WORK

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

B. Restorer: Company specializing in masonry restoration with minimum three years of documented experience.

1.8. MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Restore and repoint an existing masonry wall area sized 8 feet (2.40 m) long by 6 feet (2 m) high; include in mock-up area instances of mortar and wall openings.

C. Clean a 10 ft (3 m) by 10 ft (3 m) panel of wall to determine extent of cleaning.

D. Locate where directed.

E. Mock-up may remain as part of the Work.

1.9. DELIVERY, STORAGE, AND HANDLING

A. Store materials in covered, well-ventilated area protected from exposure to detrimental conditions, including airborne contaminants, dirt, dust, sunlight, temperatures lower than 40 degrees F (4 degrees C) or greater than 100 degrees F (38 degrees C), rainfall, sparks, or flame, and in accordance with the manufacturer's requirements. Store polymer resins and hardeners in separate area from construction materials that can absorb odors.

1.10. FIELD CONDITIONS - MASONRY WORK

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Restoration and Cleaning Chemicals:
1. PROSOCO; SAFETY KLEAN: www.prosoco.com/#sle.
2. RadonSeal; Product BRICKTASTIC.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. CLEANING MATERIALS

A. Cleaning Agent: Detergent type.

2.3. MORTAR MATERIALS

A. Comply with requirements of Section 04 05 11.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that surfaces to be cleaned are ready for work of this section.

3.2. PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.

C. Separate areas to be protected from restoration areas using means adequate to prevent damage.

D. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

E. When using cleaning methods that involve water or other liquids, install drainage devices to prevent runoff over adjacent surfaces unless those surfaces are impervious to damage from runoff.

3.3. REPOINTING

A. Perform repointing prior to cleaning masonry surfaces.

B. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch (6 mm) depth or until sound mortar is reached.

C. Do not damage masonry units.

D. When cutting is complete, remove dust and loose material by brushing.

E. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch (6 mm) layers. Form a smooth, compact concave joint to match existing.

F. Moist cure for 72 hours.

3.4. CLEANING EXISTING MASONRY

A. Wet Aggregate Cleaning: AS RECOMMENDED BY PRODUCT CLEANING AND RESTORATION CHEMICAL MANUFACTURER.

3.5. CLEANING NEW MASONRY

A. Verify mortar is fully set and cured.

B. Clean surfaces and remove large particles with wood scrapers, brass or nylon wire brushes.

C. Scrub walls with BUFFERED PROPRIETARY ACIDIC MASONRY DETERGENT type cleaning agent solution using stiff brush. Thoroughly rinse and wash off cleaning solution, dirt and mortar crumbs using clean, pressurized water.

D. Protect area below cleaning operation and keep masonry soaked with water and flushed free of acid and dissolved mortar continuously for duration of cleaning.

E. Before solution dries, rinse and remove acid solution and dissolved mortar, using clean, pressurized water.

3.6. RESTORATION CLEANING

A. Clean surfaces and remove large particles with wood scrapers or non-ferrous wire brush.

B. Brush coat masonry with SELECTED MANUFACTURER restoration cleaner, mixed into solution in accordance with manufacturer's instructions.

C. Allow sufficient time for solution to remain on masonry and agitate with soft fiber brush or sponge.

3.7. CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

END OF SECTION

SECTION 04 05 11 - MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.2. RELATED REQUIREMENTS

A. Section 04 01 00 - Maintenance of Masonry: Bedding and pointing mortar for masonry restoration work.

B. Section 04 26 13 - Masonry Veneer: Installation of mortar.

1.3. REFERENCE STANDARDS

A. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.

B. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2026a.

C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025b.

D. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

E. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025a.

F. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry; 2026.

G. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2025.

H. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.

E. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.

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

G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.5. QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

1.6. PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 40 00 - Quality Requirements.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

C. Grout Mixes: Test grout batches in accordance with ASTM C1019 procedures.
   1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.8. FIELD CONDITIONS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1. MORTAR APPLICATIONS

A. Use only factory premixed packaged dry materials for mortar, with addition of water only at project site.

B. Mortar Color: Natural gray unless otherwise indicated.

C. Mortar Mix Designs: ASTM C270, Property Specification.
   1. Exterior, Non-loadbearing Masonry: Type N.
   2. Interior, Loadbearing Masonry: Type N.
   3. Interior, Non-loadbearing Masonry: Type O.

D. Grout Mix Designs:
   1. Engineered Masonry: 3,000 psi (21 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; provide premixed type in accordance with ASTM C 94/C 94M.
      a. Fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less.
      b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

2.2. MATERIALS

A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Type: Type N.
   2. Color: Standard gray.
   3. Water repellent mortar for use with water repellent masonry units.
   4. Manufacturers:
      a. Amerimix, an Oldcastle APG brand; AMX 400 Portland Lime Mortar Mix: www.amerimix.com/#sle.
      b. SPEC MIX; TYPE PL-04.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
   1. Color: STANDARD GRAY FOR NEW CONSTRUCTION; MINERAL PIGMENTS ADDED AS REQUIRED TO PRODUCE APPROVED COLOR SAMPLE THAT BEST RESEMBLES EXISTING CONDITIONS FOR RENOVATION WORK..
   2. Manufacturers:
      a. SPEC MIX; TYPE TP-05.
      b. Amerimix, an Oldcastle APG brand; AMX 420 TUCK POINTING MORTAR MIX.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
   1. Type: Fine.
   2. Manufacturers:
      a. Amerimix, an Oldcastle APG brand; AMX 600 FG Fine Core Fill Grout: www.amerimix.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

D. Water: Clean and potable.

E. Bonding Agent: Latex type.

2.3. MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

2.4. GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1. PREPARATION

A. Apply bonding agent to existing concrete surfaces.

3.2. INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

3.3. FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 40 00 - Quality Requirements.

B. Test and evaluate mortar in accordance with ASTM C780 procedures.

C. Test and evaluate grout in accordance with ASTM C1019 procedures.

END OF SECTION

SECTION 04 26 13 - MASONRY VENEER

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Clay facing brick.

B. Reinforcement and anchorage.

C. Flashings.

D. Installation of lintels.

E. Accessories.

1.2. RELATED REQUIREMENTS

A. Section 04 01 00 - Maintenance of Masonry.

B. Section 04 05 11 - Masonry Mortaring and Grouting.

C. Section 05 50 00 - Metal Fabrications: Loose steel lintels.

D. Section 06 10 00 - Rough Carpentry: Wood stud backup for masonry veneer.

E. Section 07 62 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.

F. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3. PRICE AND PAYMENT PROCEDURES

A. See Section 01 21 00 - Allowances, for cash allowances affecting this section.

1.4. REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2026.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2025.

E. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2026.

F. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

G. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

H. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

I. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.5. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.6. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.7. QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
1. Maintain one copy of each document on project site.

B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

1.8. MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 2 feet (___ m) long by 2 feet (___ m) high; include mortar and accessories in mock-up.

1.9. DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.10. FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1. BRICK UNITS

A. Manufacturers: As Supplied by Exum Company, Inc.
1. Endicott Clay Products Co; Face Brick: www.endicott.com/#sle.
2. General Shale Brick: www.generalshale.com/#sle.

3. Statesville Brick Company.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
1. Color and texture to match Architect's sample.
2. Nominal Size: As indicated on drawings.
3. Compressive Strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.2. MORTAR MATERIALS

A. Mortar: As specified in Section 04 05 11.

2.3. REINFORCEMENT AND ANCHORAGE

A. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).
4. Manufacturers:
a. 3GEN Masonry Products; H-10 VENEER ANCHOR: www.3genmp.com.
b. Hohmann & Barnard, Inc; DW-10HS VENEER ANCHOR: www.h-b.com/#sle.
c. WIRE-BOND; 1004 TYPE III ANCHOR: www.wirebond.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.4. FLASHINGS

A. Metal Flashing Materials: Stainless Steel, as specified in Section 07 62 00.

B. Metal Flashing Materials:
1. Stainless Steel Flashing: ASTM A666/A666M, Type 304, soft temper; 26 gauge, 0.0187 inch (0.48 mm) thick; finish 2B to 2D.
2. Prefabricated Metal Flashing: Smooth fabricated 12 oz/sq ft (3.66 kg/sq m) stainless steel (type 304) flashing for thru-wall conditions.
a. Manufacturers:
1) Hohmann & Barnard, Inc; MFL: www.h-b.com/#sle.
2) WIRE-BOND; 4199: www.wirebond.com/#sle.
3) Substitutions: See Section 01 60 00 - Product Requirements.

C. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
1. Stainless Steel Flashing - Self-adhering: ASTM A240/A240M; 2 mil (0.05 mm) type 304 stainless steel sheet with 8 mil (0.20 mm) of butyl adhesive and a removable release liner.
a. Manufacturers:
1) 3GEN Masonry Products; GENFLASH SS SA: www.3genmp.com/#sle.
2) WIRE-BOND; 4160 BOND-N-FLASH SA.
3) Substitutions: See Section 01 60 00 - Product Requirements.
2. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil (.05 mm) type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
a. Manufacturers:
1) 3GEN Masonry Products; GENFLASH SS: www.3genmp.com/#sle.
2) Hohmann & Barnard, Inc; MIGHTY-FLASH: www.h-b.com/#sle.

3) WIRE-BOND; 4160 BOND-N-FLASH: www.wirebond.com/#sle.
4) Substitutions: See Section 01 60 00 - Product Requirements.

3. Stainless Steel/Polymer Fabric Flashing - Self-Adhering: ASTM A240/A240M; 2 mil (.05 mm) type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.
   a. Manufacturers:
      1) Hohmann & Barnard, Inc; MIGHTY-FLASH SA: www.h-b.com/#sle.
      2) Substitutions: See Section 01 60 00 - Product Requirements.

D. Factory-Fabricated Flashing Corners and Ends: Stainless steel.
   1. Manufacturers:
      a. 3GEN Masonry Products; CORNERS & END DAM: www.3genmp.com/#sle.
      b. Hohmann & Barnard, Inc; CORNERS & END DAMS: www.h-b.com/#sle.
      c. WIRE-BOND; 4194-4196: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

E. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane, or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
   1. Manufacturers, Modified Polyether Products:
      a. Hohmann & Barnard, Inc.; HB SEALANT
      b. WIRE-BOND; 4198 QUIK SET SEALANT
      c. 3GEN Masonry Products; GENFLASH SEALANT.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

F. Termination Bars: Stainless steel; compatible with membrane and adhesives.
   1. Manufacturers:
      a. 3GEN Masonry Products; TYPE L: www.3genmp.com/#sle.
      b. Hohmann & Barnard, Inc; T2: www.h-b.com/#sle.
      c. WIRE-BOND; 4210C: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

G. Drip Edge: Stainless steel; compatible with membrane and adhesives.
   1. Manufacturers:
      a. 3GEN Masonry Products; DRIP EDGE: www.3genmp.com/#sle.
      b. Hohmann & Barnard, Inc; DP - DRIP PLATES/EDGES: www.h-b.com/#sle.
      c. WIRE-BOND; 4165 DRIP EDGE FLASHING: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

H. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.5. ACCESSORIES

A. Preformed Control Joints: Polyvinyl chloride material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc; VS-TEE: www.h-b.com/#sle.
      b. WIRE-BOND; 2938 PLUMB RITE: www.wirebond.com/#sle.
      c. 3GEN Masonry Products; CJ-T PVC.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Joint Filler: Closed cell rubber; oversized 50 percent to joint width; self expanding; in maximum lengths available.
   1. Manufacturers:

a. Hohmann & Barnard, Inc; NS NEOPRENE SPONGE: www.h-b.com/#sle.
b. WIRE-BOND; 3300: www.wirebond.com/#sle.
c. 3GEN Masonry Products; NEOPRENE EXPANSION JOINT.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Weeps:
1. Type: Molded PVC grilles, insect resistant.
2. Color(s): As selected by Architect from manufacturer's full range.
3. Manufacturers:
a. Hohmann & Barnard, Inc; QV - QUADRO-VENT: www.h-b.com/#sle.
b. WIRE-BOND; 3601: www.wirebond.com/#sle.
c. 3GEN Masonry Products; CELL VENT.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
1. Mortar Diverter: Panels installed at flashing locations.
a. Manufacturers:
1) 3GEN Masonry Products; MORTAR CLEAR: www.3genmp.com/#sle.
2) WIRE-BOND; 3611D CAVITY NET DT
3) Hohmann & Barnard, Inc.; MORTAR TRAP.
4) Substitutions: See Section 01 60 00 - Product Requirements.

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2. COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Brick Units:
1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

3.3. PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners, except for units laid in stack bond.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.

3.4. WEEPS/CAVITY VENTS

A. Install weeps in veneer walls at 16 inches (406 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.5. CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
1. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness.
2. Hold cavity mortar control panel tight to face wythe.
3. Install horizontally between joint reinforcement.
4. Stagger end joints in adjacent rows.
5. Fit to perimeter construction and penetrations without voids.

D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.6. REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches (400 mm) on center vertically and 24 inches (600 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

3.7. MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 1 inch (25.4 mm), minimum, to form watertight pan at non-masonry construction.
2. Remove or cover protrusions or sharp edges that could puncture flashings.
3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:
1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.

3. Anchor vertical leg of flashing into backing with a termination bar and sealant.
4. Apply cap bead of sealant on top edge of self-adhered flashing.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

E. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.8. LINTELS

A. Install lintels over openings.

3.9. CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Form expansion joint as detailed on drawings.

3.10. TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

3.11. CUTTING AND FITTING

A. Cut and fit for pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.12. CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.13. PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Shop fabricated steel items.

1.2. RELATED REQUIREMENTS

1.3. PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional requirements.

1.4. REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

H. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

I. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2025a.

J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

K. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

M. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

N. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

O. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

P. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

Q. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
      a. Include the following, as applicable:
         1) Design criteria.
         2) Engineering analysis depicting stresses and deflections.
         3) Member sizes and gauges.
         4) Details of connections.
         5) Support reactions.
         6) Bracing requirements.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.6. QUALITY ASSURANCE

A. Design _____ under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1. MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Plates: ASTM A283/A283M.

C. Stainless Steel, General: ASTM A666/A666M, Type 304.

D. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.

E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2. MATERIALS - ALUMINUM

A. Bolts, Nuts, and Washers: Stainless steel.

B. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3. FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.4. FABRICATED ITEMS

A. Joist Hangers: Strap anchors, fabricated with sheet steel, 18 gauge, 0.0478 inch (1.21 mm) minimum base metal thickness; galvanized finish.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

C. Lintels: As detailed; prime paint finish.

D. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

2.5. FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: Two coats.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating. (Provide minimum 530 g/sq m galvanized coating.)

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

G. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

H. Stainless Steel Finish: No. 4 Bright Polished finish.

2.6. FINISHES - ALUMINUM

A. Exterior Aluminum Surfaces: Class I color anodized.

B. Interior Aluminum Surfaces: Class I natural anodized.

C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

D. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.7. FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2. PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3. INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on shop drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.4. TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 51 33 - METAL LADDERS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Shop-fabricated metal ladders.

B. Prefabricated ladders.

1.2. RELATED REQUIREMENTS

A. Section 11 81 29 - Facility Fall Protection: Ladder safety systems.

1.3. PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional requirements.

1.4. REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ANSI A14.3 - American National Standard for Ladders - Fixed - Safety Requirements; 2008 (Reaffirmed 2018).

C. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2025.

D. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2025.

E. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

F. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2026.

G. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.

H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

I. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

K. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

L. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

F. Specimen warranty.

G. Executed warranty.

1.6. QUALITY ASSURANCE

A. Design _____ under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.7. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for material and workmanship. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1. MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6061 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

F. Aluminum-Alloy Die Castings: ASTM B85/B85M .

G. Bolts, Nuts, and Washers: Stainless steel.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.2. FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3. PREFABRICATED LADDERS

A. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
   1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
   2. Materials: Aluminum; 6061 alloy, T6 temper.
   3. Finish: Mill finish aluminum.
   4. Manufacturers:
      a. Alaco Ladder Company; 564HD WITH 72" SECURITY DOOR: www.alacoladder.com/#sle.
      b. O'Keeffe's Inc; MODEL 503 WITH SECURITY DOOR: www.okeeffes.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4. FINISHES - ALUMINUM

A. Exterior Aluminum Surfaces: Class I natural anodized.

B. Interior Aluminum Surfaces: Class I natural anodized.

C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

D. Apply 2 coats of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.5. FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2. PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3. INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on shop drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.4. TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Floor mounted handrails and guardrails.

1.2. RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 09 91 13 - Exterior Painting: Paint finish.

1.3. REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. AISC 207 - Standard for Certification Programs; 2025.

D. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.

E. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.

F. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2022.

G. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.

H. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Drawn Pipe for General Purpose Applications; 2021.

I. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.

J. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2024.

K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

L. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

N. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017, with Amendment (2021).

O. AWS C3.4M/C3.4 - Specification for Torch Brazing; 2026.

P. AWS C3.5M/C3.5 - Specification for Induction Brazing; 2026.

Q. AWS C3.9M/C3.9 - Specification for Resistance Brazing; 2020.

R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
2. Include the design engineer's seal and signature on each sheet of shop drawings.

C. Samples: Submit two, 12 inch (____ mm) long samples of handrail. Submit two samples of elbow, wall bracket, and end stop.

D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.

E. Designer's Qualification Statement.

F. Fabricator's Qualification Statement.

1.5. QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.

C. Fabricator Qualifications:
1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 207.
2. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
3. A company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Handrails and Railings:
1. Awning and Sign Contractors: www.ascfabricators.com/#sle.
2. Greco Aluminum Railings: www.grecorailings.com/#sle.
3. Kane Innovations; STERLING DULA PIPE RAILING: www.kaneinnovations.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Accessibility-Compliant Handrail Brackets:
1. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Comply with ASTM E985.

C. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935

D. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935

E. Allow for expansion and contraction of members and building movement without damage to connections or members.

F. Dimensions: See drawings for configurations and heights.
1. Top Rails and Wall Rails: 1-1/2 inches (38 mm) diameter, round.
2. Intermediate Rails: 1-1/2 inches (38 mm) diameter, round.
3. Posts: 1-1/2 inches (38 mm) diameter, round.
4. Bottom Rail / Midrail: 1-1/2 inches (38 mm) diameter, round.

G. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
2. Posts: Provide adjustable flanged brackets.

H. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

I. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
1. Ease exposed edges to a small uniform radius.
2. Welded Joints:
    a. Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
    b. Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
3. Brass/Bronze Brazed Joints:
    a. Perform torch brazing in accordance with AWS C3.4M/C3.4.
    b. Perform induction brazing in accordance with AWS C3.5M/C 3.5.
    c. Perform resistance brazing in accordance with AWS C3.9M/C3.9.

2.3. ALUMINUM MATERIALS

A. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

B. Aluminum Tube: Minimum wall thickness of 0.127 inch (3.2 mm); ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

C. Solid Bars and Flats: ASTM B211/B211M.

D. Non-Weld Mechanical Fittings: Slip-on cast aluminum, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

E. Welding Fittings: No exposed fasteners; cast aluminum.

F. Straight Splice Connectors: Concealed spigot; cast aluminum.

G. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

2.4. FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Weld connections that cannot be shop welded due to size limitations.
1. Weld in accordance with AWS D1.1/D1.1M.
2. Match shop welding and bolting.
3. Clean welds, bolted connections, and abraded areas.
4. Touch up shop primer and factory-applied finishes.
5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

2.5. ALUMINUM 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. Color: To be selected by Architect from manufacturer's standard line.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2. PREPARATION

A. Clean and strip aluminum where site welding is required.

B. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

C. Apply 2 coats of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

3.3. INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Install railings in compliance with ADA Standards for accessible design at applicable locations.

D. Anchor railings securely to structure.

E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.

F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4. TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Structural dimension lumber framing.

B. Nonstructural dimension lumber framing.

C. Rough opening framing for doors, windows, and roof openings.

D. Sheathing.

E. Roofing nailers.

F. Roofing cant strips.

G. Preservative treated wood materials.

H. Fire retardant treated wood materials.

I. Miscellaneous framing and sheathing.

J. Communications and electrical room mounting boards.

K. Concealed wood blocking, nailers, and supports.

L. Miscellaneous wood nailers, furring, and grounds.

M. Wall sheathing with factory applied water-resistive and air barrier sheet.

N. Roof sheathing with factory applied roofing underlayment.

1.2. RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.3. REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2021.

D. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2026).

E. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).

F. ASTM E2357 - Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies; 2025.

G. ASTM E2556/E2556M - Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment; 2010 (Reapproved 2022).

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

J. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024, with Errata.

K. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2026.

L. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.

M. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

N. ICC-ES AC310 - Acceptance Criteria for Water-Resistive Membranes Factory-Bonded to Wood-Based Structural Sheathing, Used as Water-Resistive Barriers; 2008, with Editorial Revision (2021).

O. ITS (DIR) - Directory of Listed Products; Current Edition.

P. PS 1 - Structural Plywood; 2023.

Q. PS 2 - Performance Standard for Wood Structural Panels; 2019.

R. PS 20 - American Softwood Lumber Standard; 2025.

S. SPIB (GR) - Standard Grading Rules; 2021.

T. UL (DIR) - Online Certifications Directory; Current Edition.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on application instructions.

C. Product Data: Submit technical data on wood treatment.

D. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

E. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

F. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

G. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

H. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5. QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.6. DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.7. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for materials and workmanship commencing on Date of Substantial Completion.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1. GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.2. DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
   1. Grade: No. 2.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.3. CONSTRUCTION PANELS

A. Roof Sheathing: Oriented strand board structural wood panel, PS 2, with factory laminated roofing underlayment layer.
   1. Sheathing Panel:
      a. Grade: Structural 1 sheathing.
      b. Size: 4 feet (1219 mm) wide by 8 feet (2438 mm) long.
      c. Performance Category: 5/8 PERF CAT.
      d. Span Rating: 40/20.
   2. Integral Roofing Underlayment Layer: Medium density, phenolic impregnated kraft paper overlay.
   3. Exposure Time: Sheathing undamaged and integral roofing underlayment layer intact after exposure to weather for up to 180 days.
   4. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center.
   5. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied seam tape consisting of polyolefin film with acrylic adhesive.
   6. Warranty: Manufacturer's standard 30 year limited system warranty of:
      a. Performance: Panel and tape resistance to water penetration; tape adhesion.
      b. Material: Free from manufacturing defects and panel delamination.
   7. Products:
      a. Huber Engineered Woods, LLC; ZIP System Roof/Wall Sheathing and ZIP System Seam Tape: www.huberwood.com/#sle.

B. Wall Sheathing: Oriented strand board structural wood panel with factory-laminated, water-resistive barrier layer.
   1. Sheathing Panel: PS 2, Exposure 1.
      a. Size: 4 feet (1219 mm) wide by 8 feet (2438 mm) long.
      b. Grade: Structural 1 Sheathing.
      c. Performance Category: 1/2 PERF CAT.
      d. Span Rating: 32/16.
   2. Integral Water-Resistive Barrier: Sheet material qualifying as a Grade D water-resistive barrier; complying with ICC-ES AC310.
   3. Water Vapor Permeance of Water-Resistive Barrier: 12 to 16 perms (689 to 918 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure B.
   4. Maximum Allowable Air Leakage of Assembly: Comply with ASTM E2357.
      a. Infiltration: 0.0072 cfm/sq ft (0.037 L/s per sq m), maximum, at a pressure differential of 1.57 psf (75 Pa).
      b. Exfiltration: 0.0023 cfm/sq ft (0.012 L/s per sq m), maximum, at a pressure differential of 1.57 psf (75 Pa).
   5. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
   6. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied, seam tape.
   7. Warranty: Manufacturer's standard 30 year limited system warranty.
      a. Performance: Panel and tape resistance to water penetration; tape adhesion.
      b. Material: Free from manufacturing defects and panel delamination.
   8. Products:

a. Huber Engineered Woods, LLC; ZIP System Roof/Wall Sheathing and ZIP System Seam Tape: www.huberwood.com/#sle.

C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

D. Other Applications:
1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
3. Other Locations: PS 1, C-D Plugged or better.

2.4. FIRE-RETARDANT TREATMENT (FRT)

A. Products:
1. Arxada; Dricon Tempus: www.arxada.com/#sle.
2. Hoover Treated Wood Products, Inc; PYROGUARD: www.frtw.com/#sle.
3. Koppers, Inc; FLAMEPRO: www.koppersperformancechemicals.com/#sle.
4. Viance, LLC; D-Blaze: www.treatedwood.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated.

C. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (LT), Low-Temperature (low hygroscopic).
1. Treat electrical and communications panel backer boards.
2. Treat wood in locations indicated on drawings.

D. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.

E. Fabrication of FRT Wood:
1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
3. Field cutting and drilling of holes in plywood are permitted.

F. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke developed index, method of drying after treatment, and treating standard.
1. In addition, label Exterior Type B wood with the words: NO INCREASE IN THE LISTED CLASSIFICATIONS WHEN SUBJECTED TO THE STANDARD RAIN TEST. In accordance with ASTM D2898.

2.5. PRESSURE-PRESERVATIVE TREATMENT (PPT)

A. Products:
1. Great Southern Wood Preserving, Inc; YellaWood (Pressure Treated Pine): www.yellawood.com/#sle.
2. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com/#sle.
3. Viance, LLC; Preserve ACQ: www.treatedwood.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated.

C. Preservative Limitations for Interior Use Categories UC1 and UC2:

1. Use SBX preservative with 0.28 pcf (4.5 kg/cu m) retention for resistance to Formosan termites.

D. Kiln-dry wood after treatment with waterborne preservative to maximum moisture content of 19 percent for lumber and 15 percent for plywood.

E. Fabricate to maximum extent possible before treatment.

F. Label preservative-treated wood with marking as required by AWPA U1 and ICC (IBC). Unless otherwise permitted by standard U1 and the building code, include the following markings: AWPA U1, accredited inspection agency's mark, treating plant identification, type of preservative, preservative retention, and permitted end use.

G. Field Treatment for Cuts and Holes in Preservative-Treated Wood: Comply with AWPA M4.

2.6. MOLD-RESISTANT TREATMENT

A. Products:
1. Arxada; FrameGuard: www.arxada.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Factory-applied mold and decay preventative treatment with green colorant.

2.7. ACCESSORIES

A. Metal and Finish of Fasteners:
1. Fire-Retardant-Treated Wood:
   a. Nails, timber rivets, wood screws, and lag screws: Type 304 stainless steel.
   b. Staples: Type 304 stainless steel.
   c. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
2. Preservative-Treated Wood:
   a. Nails, timber rivets, wood screws, and lag screws - general use: Type 304 stainless steel.
   b. Staples: Type 304 stainless steel.
   c. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
3. High Humidity Wood Locations: Type 304 stainless steel.
4. Untreated Wood: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
5. Screws in Structural Cementitious Subflooring: Comply with code evaluation service report.
6. Screws in Structural Cementitious Roof Sheathing: Comply with code evaluation service report.

B. Anchors:
1. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.

D. Sill Gasket on Top of Foundation Wall: 3/8 inch (9.5 mm) thick, closed-cell plastic foam.
1. Width: 5-1/2 inches (140 mm).
2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.
3. Products:
   a. Protecto Wrap Company: www.protectowrap.com/#sle.
   b. OWENS CORNING; ProPink ComfortSeal.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Liquid Flashing: One-part, fast-curing, nonsag, elastomeric, gun grade, trowelable liquid flashing.
   1. Products:
      a. Huber Engineered Woods, LLC; ZIP System Liquid Flash: www.huberwood.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

F. Sill Flashing: See Section 07 62 00.

G. General Purpose Construction Adhesives: Comply with ASTM C557.
   1. Products:
      a. Franklin International, Inc; Titebond Contractor Grade Subfloor Adhesive: www.titebond.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

H. Radiant Barrier: Aluminum radiant barrier; designed for factory laminating to roof sheathing.
   1. Products:
      a. Louisiana-Pacific Corporation; TechShield: www.lpcorp.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

I. Rainscreen Drainage and Ventilation Mat: Three-dimensional polymer matrix with fabric facing on exterior side.
   1. Water Resistance: Comply with ASTM E2556/E2556M, Type I.
   2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less when tested in accordance with ASTM E84.
   3. Thickness: 1/4 inch (6 mm).
   4. Products:
      a. Huber Engineered Woods, LLC; ZIP System Rainscreen: www.huberwood.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

J. Seam and Perimeter Tape: Polyethylene-faced material with acrylic adhesive.
   1. Thickness: 12 mils, 0.012 inch (0.304 mm).
   2. Products:
      a. Huber Engineered Woods, LLC; ZIP System Flashing Tape: www.huberwood.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

3.2. INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3. FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.4. BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

E. Provide nonstructural framing and blocking to support the following:
1. Cabinets and shelf supports.
2. Wall brackets.
3. Handrails.
4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.
10. Other wall- or ceiling-mounted items indicated on drawings.

3.5. ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

3.6. INSTALLATION OF CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

B. Wall Sheathing and Roof Sheathing with Laminated Water-Resistive Barrier and Air Barrier: Secure to studs in accordance with manufacturer's installation instructions.
   1. Install with laminated water-resistive and air barrier on exterior side of sheathing.
   2. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
   3. Use only mechanically attached and drainable EIFS and exterior insulation with wall sheathing with laminated water-resistive and air barrier.
   4. Apply manufacturer's standard seam tape to joints between sheathing panels; use tape gun or hard rubber roller in accordance with manufacturer's installation instructions.

3.7. SITE-APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.8. TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.9. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Coordination of ABAA Tests and Inspections:
   1. Provide testing and inspection required by ABAA QAP.
   2. Notify in ABAA writing of schedule for air barrier work. Allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

3.10. CLEANING

A. Waste Disposal: See Section 01 74 19 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Preservative treatment (PPT).

B. Fire-retardant treatment (FRT).

C. Communications and electrical room mounting boards.

D. Lumber and plywood in contact with membrane roofing and flashing.

E. Lumber and plywood in contact with membrane waterproofing and flashing.

F. Concealed wood blocking, nailers, and supports.

1.2. REFERENCE STANDARDS

A. APA E30 - Engineered Wood Construction Guide; 2019.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2021.

D. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2026).

E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.

F. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2026.

G. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.

H. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. ITS (DIR) - Directory of Listed Products; Current Edition.

J. PS 1 - Structural Plywood; 2023.

K. PS 20 - American Softwood Lumber Standard; 2025.

L. SPIB (GR) - Standard Grading Rules; 2021.

M. UL (DIR) - Online Certifications Directory; Current Edition.

1.3. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Fire-retardant treatment.
   2. Pressure-preservative treatment.
   3. Field-applied preservative treatment product data and application instructions.

1.4. DELIVERY, STORAGE, AND HANDLING

A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and allow air circulation.

B. Fire-Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1. GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org), and that provides grading service for species and grade specified. Provide lumber stamped with grade mark unless otherwise indicated.

2.2. DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Stud Framing for sizes 2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm):
   1. Grade: No.2.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No.2 or Standard Grade.
   2. Boards: Standard or No.3.

F. Sill Plates: 1-1/2 inch (38 mm) thick laminated strand lumber.
   1. Comply with AWPA U1 use category 2.
   2. Products:
      a. Prebuck, LLC; Sill Plate: www.tremcosealants.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

G. Parapet Caps: 1-1/2 inch (38 mm) thick, laminated strand lumber.
   1. Comply with AWPA U1 use category 2.
   2. Products:
      a. Prebuck, LLC; Parapet Cap: www.tremcosealants.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood; 3/4 inch (19 mm) thick; fire-retardant treated.

2.4. FIRE-RETARDANT TREATMENT (FRT)

A. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated.

B. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (LT), Low-Temperature (low hygroscopic).
1. Treat electrical and communications panel backer boards.
2. Treat wood in locations indicated on drawings.

C. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.

D. Fabrication of FRT Wood:
1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
3. Field cutting and drilling of holes in plywood are permitted.

E. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke-developed indexes, method of drying after treatment, and treating standard.

2.5. PRESSURE-PRESERVATIVE TREATMENT (PPT)

A. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated.

B. Kiln-dry wood after treatment with waterborne preservative to maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Perform fabrication such as cutting, boring, milling, and surfacing to maximum extent practicable before treatment.

D. Label preservative-treated wood with marking as required by AWPA U1 and ICC (IBC). Unless otherwise permitted by standard U1 and the building code, include the following markings: AWPA U1, accredited inspection agency's mark, treating plant identification, type of preservative, retention, and end use.

E. Field Treatment for Cuts and Holes in Preservative-Treated Wood: Comply with AWPA M4.

2.6. ACCESSORIES

A. Metal and Finish of Fasteners:
1. Fire-Retardant-Treated Wood:
   a. Nails, timber rivets, wood screws, and lag screws: Type 304 stainless steel.
   b. Staples: Type 304 stainless steel.
   c. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
2. Preservative-Treated Wood:
   a. Nails, timber rivets, wood screws, and lag screws - general use: Type 304 stainless steel.
   b. Staples: Type 304 stainless steel.
   c. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
3. Untreated Wood: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.

B. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

PART 3 EXECUTION

3.1. PREPARATION

A. Where wood framing bears on cementitious foundations, install full-width sill flashing over top of foundation, lap ends of flashing minimum of 4 inches (100 mm), and seal.

B. Install sill gasket under sill plate bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

3.2. INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to greatest extent possible; clearly separate scrap for use on-site as accessory components, including shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3. BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code to close concealed draft openings between floors and between top story and roof and attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items unless item can be securely fastened to two or more studs or another method of support is explicitly indicated.

D. Where ceiling mounting is indicated, provide blocking and supplementary supports above ceiling unless another method of support is explicitly indicated.

E. Provide the following specific nonstructural framing and blocking:
1. Cabinets and shelf supports.
2. Wall brackets.
3. Handrails.
4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Wall paneling and trim.
8. Joints of rigid wall coverings that occur between studs.

3.4. ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide blocking and nailers required by roofing assembly.

C. Provide wood curb at roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.5. WATERPROOFING-RELATED CARPENTRY

A. Coordinate installation of carpentry with deck construction, framing of openings, and waterproofing assembly installation.

B. Provide blocking and nailers required by waterproofing assembly.

C. Provide wood curb at openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.6. INSTALLATION OF CONSTRUCTION PANELS

A. Construction Panels - General: Install in accordance with APA E30.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs; space fasteners at maximum 24 inches (610 mm) on center.
1. At fire-rated walls, install board over wallboard indicated as part of fire-rated assembly.
2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.
4. Size and Location: As indicated on drawings.

3.7. SITE-APPLIED WOOD TREATMENT

A. Apply preservative treatment to field-cut surfaces in accordance with manufacturer's instructions wherever cuts, holes, sawing, or other fabrication of wood members is required after pressure-preservative treatment.

B. Apply preservative treatment in accordance with manufacturer's instructions.

C. Allow preservative to dry prior to erecting members.

3.8. CLEANING

A. Waste Disposal: See Section 01 74 19 - Construction Waste Management and Disposal.
1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on ground or buried in fill.

C. Prevent sawdust and wood shavings from entering storm drainage system.

END OF SECTION

SECTION 061600.16 - SHEATHING (ZIP SYSTEM®)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Combination wall sheathing, water resistive barrier and air barrier.
2. Combination roof sheathing and roof underlayment.
3. Self-adhering flexible flashing.
4. Liquid-applied flashing membrane.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
3. Section 072700 "Air Barriers".

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. For panels with integral water resistive barrier, include data on air/-moisture-infiltration protection based on testing according to referencing standards.

B. Sustainable Design Submittals:

1. Inputs for EA Prerequisite 2 and Credit EA 1: Proposed design input for exterior wall construction with air barrier performance taken into consideration.
2. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.
3. Certificates for Credit MR 5.1 or 5.2: Certificates verifying that materials were extracted, processed, and manufactured within 500 miles (805 km) of the project site.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.

B. Code Compliance: Comply with requirements of the following:

1. International Code Council (ICC), ICC-ESR1473.
2. International Code Council (ICC), ICC-ESR1474.
3. International Code Council (ICC), ICC-ESR2227.
4. International Association of Plumbing and Mechanical Officials (IAPMO); IAPMO-ER365.
5. State of Florida, Florida Product Approval FL 5930.
6. State of Florida, Florida Product Approval FL 6565.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Outdoor Storage. Comply with manufacturer's recommendations and as follows:

1. Set panel bundles on supports to keep off ground.
2. Cover panels loosely with waterproof protective material.
3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

1.6 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of sheathing system that fail due to manufacturing defects within specified warranty period.

1. Construction Period Warranty: Manufacturer shall warrant the panels and tape for weather exposure for a period of 180 days from installation.
2. System Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

A. Oriented Strand Board: DOC PS 2-10.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated. Thickness shall satisfy minimum and maximum requirements for referenced performance category.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 COMBINATION WALL SHEATHING, AIR AND WATER-RESISTIVE BARRIER

A. Oriented-Strand-Board Wall Sheathing: With integral water-resistive barrier, Exposure 1 sheathing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System® Wall Sheathing or a comparable product by one of the following:

a. <Insert manufacturer's name.>

2. Span Rating, Panel Grade and Performance Category: Not less than [**24/16; Rated Sheathing 7/16 Performance Category**] [**24/16; Structural 1, 7/16 Performance Category**] [**24/0; 7/16 Performance Category**] [**32/16; Structural 1, 1/2 Performance Category**].
3. Edge Profile: **[Square edge] [Self-spacing profile]**.
4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-inches (406 mm) and 24-inches (610 mm) on centers spacing.
5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1474.
6. Factory laminated integral water-resistive barrier facer.
7. Perm Rating of Integral Water-Resistive Barrier: 12-16 perms.
8. Assembly maximum air leakage of 0.0072 cfm/sq. ft. (0.037 L/s x sq. m) infiltration and 0.0023 cfm/ sq. ft. (0.012 L/s x sq. m) exfiltration at a pressure differential of 1.57 (psf 75 Pa).
9. Exposure Time: Designed to resist weather exposure for 180 days.

2.4 COMBINATION ROOF SHEATHING AND ROOF UNDERLAYMENT

A. Oriented-Strand-Board Roof Sheathing: [**With integral water-resistive barrier, Exposure** 1, **Structural** I] [**With integral water-resistive barrier, Exposure 1**] sheathing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System® Roof and Wall Sheathing or a comparable product by one of the following:

a. <**Insert manufacturer's name**>.

2. Span Rating, Panel Grade and Performance Category: Not less than [**24/16; Rated Sheathing; 7/16 Performance Category**] [**32/16; Structural 1; 1/2 Performance category**] [**40/20; Structural 1; 5/8 Performance Category**].
3. Edge Profile: [**Square edge**] [**Tongue and groove**] [**Self-spacing profile**].
4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-inches (406 mm) and 24-inches (610 mm) on center spacing.
5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1473.
6. Factory laminated integral roofing underlayment facer.
7. Exposure Time: Designed to resist weather exposure for 180 days.

B. Panel Edge Clips: Provide panel edge clips approved for application in accordance with code approvals and panel manufacturer's written instructions.

2.5 FASTENERS

A. General: Provide fasteners of size and type that comply with requirements specified in this article by the authority having jurisdiction, International Building Code, International Residential Code, Wood Frame Construction manual, and National Design Specification.

2.6 MISCELLANEOUS MATERIALS

A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.

1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System® Seam and Flashing Tape or a comparable product by one of the following:

    a. <**Insert manufacturer's name**>.

2. Thickness: 0.012 inch (0.3 mm).
3. Width: [3.75 inch (95.3 mm)] [6 inch (152.4 mm)].
4. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 - Acceptance Criteria for Flexible Flashing Materials."
5. International Code Council (ICC), ICC-ES ESR2227.
6. American Architectural Manufacturer's Association; AAMA 711.

B. Liquid-Applied Flashing Membrane: Gun-grade, cold-applied, silyl-terminated polyether (STPE) liquid flashing membrane compatible with sheathing/weather barrier and self-adhering seam and flashing tape, and tested as part of an assembly meeting performance requirements. Follow manufacturer's recommendation for integration with self-adhering seam and flashing tape.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods; ZIP System® Liquid Flash or a comparable product by one of the following:

    a. <**Insert manufacturer's name**>.

2. Hardness, Shore A, ASTM C 661: 40 to 45.
3. Total Solids: 99 percent.
4. Tensile Strength, ASTM D 412: 75 psi (517 kPa).

C. Self-Adhering Flexible Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, flexible flashing tape consisting of a flexible acrylic foam backing with acrylic adhesive.

1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System® Stretch Tape or a comparable product by one of the following:

a. <**Insert manufacturer's name**>.

2. Thickness: 0.042 inch (1.067 mm).
3. Width: [**6 inch (150 mm)**] [**10 inch (254 mm)**].
4. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 - Acceptance Criteria for Flexible Flashing Materials."
5. International Association of Plumbing and Mechanical Officials (IAPMO), IAPMO ER365.
6. American Architectural Manufacturer’s Association; AAMA 711.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Chapter 23 in the ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

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

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Only mechanically attached and drainable EIFS and exterior insulation should be used with ZIP System wall sheathing.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

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

B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:

a. Nail or staple to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.
d. Install fasteners 3/8 inch (9.5 mm) to 1/2 inch (12.7 mm) from panel edges.
e. Space fasteners in compliance with requirements of authority having jurisdiction.

3.3 SHEATHING JOINT TREATMENT

A. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply seam tape to joints between sheathing panels.
2. Utilize tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.
3. When using liquid-applied flashing to seal sheathing joints follow manufacturer’s recommendations for sealing panel seams.

3.4 FLEXIBLE OR LIQUID-APPLIED FLASHING INSTALLATION

A. Apply tape flexible flashing or membrane where indicated to comply with manufacturer's written instructions.

1. After flexible flashing tape has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
2. Width for flexible flashing: 6 inch (154.4 mm).
3. Apply liquid-applied flashing membrane at penetrations, gaps, and cracks to form continuous weathertight surface. Apply liquid membrane according to manufacturer’s written instructions. Follow manufacturer’s recommendation for integration with seam and flashing tape.

B. Apply liquid applied flashing membrane where indicated to comply with manufacturer's written instructions.

1. After liquid applied flashing membrane has been applied, tool wet product with a plastic spreader, putty knife, or similar tool to ensure that flashing is opaque and substrate is no longer visible.
2. Minimum Thickness for Liquid Flashing: 12 mils (0.3 mm).

3. Apply liquid flashing membrane according to manufacturer's written instructions. Follow manufacturer's recommendations for integration with seam and flashing tape or flexible flashing tape.

C. Apply flexible flashing tape where indicated to comply with manufacturer's written instructions.

1. After flexible flashing tape has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
2. Width of flexible flashing: 6 inches (154.4 mm) or 10 inches (254 mm).

END OF SECTION

SECTION 06 17 60 - METAL-PLATE-CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes wood roof trusses and truss accessories.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for roof sheathing and subflooring and dimension lumber for supplementary framing and permanent bracing.

1.3 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NLGA - National Lumber Grades Authority.
2. SPIB - Southern Pine Inspection Bureau.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated in the general notes on the structural drawings.
2. Maximum Deflection Under Design Loads:

a. Roof Trusses: Vertical deflection of 1/240 of span.
b. Roof Trusses: Horizontal deflection at reactions of 1 inch.

1.5 SUBMITTALS

A. Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners.

B. Shop Drawings(signed and sealed by the qualified South Carolina professional engineer): Show location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber; splice details; type, size, material, finish, design values, orientation, and location of metal connector plates; and bearing details.

1. For all trusses and installed products, include structural analysis data signed and sealed by the qualified South Carolina professional engineer responsible for their preparation. Retain paragraph below if certificates are required by authorities having jurisdiction.

C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.

D. Qualification Data: For metal-plate manufacturer, fabricator, and Installer.

E. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

1.6 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Source Limitations for Connector Plates: Obtain metal connector plates through one source from a single manufacturer.

D. Comply with applicable requirements and recommendations of the following publications:

1. TP1 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."

E. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with TPI recommendations to avoid damage and lateral bending. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.8 COORDINATION

A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Metal Connector Plates:

    a. Alpine Engineered Products, Inc.
    b. Mitek Industries, Inc.
    c. Robbins Engineering, Inc.
    d. Truswal Systems Corporation.
    e. Boozer Truss Systems

2. Metal Framing Anchors:

    a. Alpine Engineered Products, Inc.
    b. Simpson Strong-Tie Company, Inc.
    c. United Steel Products Company, Inc.

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive natural or stained finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, manufactured to actual sizes required by DOC PS 20 for moisture content specified.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

B. Grade and Species: Provide dimension lumber of any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

C. Grade and Species: Provide visually graded dimension lumber for truss chord and web members, of the following grade and species:

1. Grade for Chord Members: No. 1.
2. Grade for Web Members: Same grade as indicated for chord members.
3. Species: Southern pine; SPIB.

2.3 METAL CONNECTOR PLATES

A. General: Fabricate connector plates to comply with TPI 1 from metal complying with requirements indicated below:

B. Hot-Dip Galvanized Steel Sheet: ASTM A 653/A 653M, G60 coating designation; Designation SS, Grade 33, and not less than 0.036 inch thick.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.5 METAL FRAMING ANCHORS

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:

1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

C. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of truss and fastens to both sides of truss, face of top plates, and side of stud below.

D. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. Before installing, splice trusses delivered to Project site in more than one piece.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not cut or remove truss members.

L. Replace wood trusses that are damaged or do not meet requirements.

1. Do not alter trusses in field.

3.2 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply primer, when part of coating system, and one coat of protective coating.

1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

END OF SECTION 06176

SECTION 07 21 00 - THERMAL INSULATION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Board insulation at over roof deck and over roof sheathing.

B. Batt insulation in exterior wall, ceiling, and roof construction.

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

1.2. RELATED REQUIREMENTS

1.3. DEFINITIONS

A. Mineral Fiber Material Composition: Insulation referred to as mineral fiber block, board, and blanket insulation is composed of fibers from mineral based substances such as rock, slag, or glass and processed from the molten state into fibrous form.
   1. Based on type of insulation substance, the material will be referred to as a mineral fiber when having a rock or slag base, and glass fiber with a glass or silica sand base, also considered a mineral.
   2. Insulation blankets are flexible units consisting of felted, bonded, or unbonded fibers formed into rolls or flat cut pieces referred to as batts; rolls are simply longer versions of batts.
   3. For additional information about mineral fiber and the various classification types, refer to the following reference standards; ASTM C553, ASTM C612, ASTM C665, and ASTM C726.

1.4. REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

F. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2024.

G. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

J. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

K. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2021a.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Shop Drawings: Submit drawings that indicate location of joint or termination detail conditions.

D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

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

F. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

G. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

H. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.

1.6. QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.7. FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1. APPLICATIONS

A. Insulation in Wood Framed Walls: Batt insulation with no vapor retarder.

B. Insulation in Wood Framed Ceiling Structure: Batt insulation with no vapor retarder.

C. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

D. Insulation over Roof Deck: Polyisocyanurate board.

2.2. FOAM BOARD INSULATION MATERIALS

A. Rigid Cellular Polyisocyanurate (ISO) Thermal Insulation Board with Facers Both Sides: Complying with ASTM C1289.
   1. Classifications:
      a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
         1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
         3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; Class 3 - 7.5 (1.32), minimum, at 75 degrees F (24 degrees C).
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
   5. Board Thickness: 1.75 inch (____ mm).
   6. Board Edges: Square.
   7. Products:
      a. GAF; EnergyGuard Polyiso Insulation: www.gaf.com/#sle.
      b. Johns Manville; ENGRGY 3 CGF - FLAT AND TAPERED: www.jm.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Polyisocyanurate (ISO) Composite Board Insulation: Rigid cellular foam laminated to high-density cover board layer; comply with ASTM C1289.
   1. Type IV ISO insulation layer laminated to 1/2-inch thick, high-density ISO cover layer.
   2. Type II ISO Cover Layer, Compressive Strength: 80 psi (551 kPa).
   3. Glass facers on both major surfaces.
   4. Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 8.2 (1.23), minimum, at 75 degrees F (24 degrees C).
   5. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   6. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   7. Board Thickness: 4.0 inch (102 mm).
   8. Board Edges: Square.
   9. Products:
      a. Elevate Commercial Building Products; ISOGARD HD Composite: www.elevatecommercialbp.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Polyisocyanurate (ISO) Cover Board Insulation: Rigid high-density polyisocyanurate cover board; comply with ASTM C1289.
   1. Type II ISO Cover Layer, Compressive Strength: 80 psi (551 kPa).
   2. Glass facers on both major surfaces.
   3. Thermal Resistance, R-value (RSI-value): At 1/2 inch (12.7 mm) thick; 2.5 (0.41), minimum, at 75 degrees F (24 degrees C).
   4. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   5. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   6. Water Vapor Permeance: Less than 1 perm (57.5 ng/(Pa s sqm)) when tested in accordance with ASTM E96/E96M.
   7. Board Thickness: 1/2 inch (12.7 mm).
   8. Board Edges: Square.
   9. Products:
      a. Elevate Commercial Building Products; ISOGARD HD Cover Board: www.elevatecommercialbp.com/#sle.
      b. Johns Manville; ENRGY 3 HD: www.jm.com/#sle..
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. MINERAL FIBER BLANKET INSULATION MATERIALS

A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   4. Formaldehyde Content: Zero.
   5. Products:
      a. Johns Manville; FORMALDEHYDE-FREE FIBERGLASS INSULATION: www.jm.com/#sle.
      b. Owens Corning Corporation; PINK Next Gen FIBERGLAS Insulation: www.owenscorning.com/en-us/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Mineral Fiber Enclosure for Recessed Ceiling Fixtures: Insulated box enclosure with foil facing on exterior side for placement over recessed ceiling light fixture; flame spread index of 25 or less, and smoke development index of 450 or less when tested in accordance with ASTM E84.
   1. Light Fixture Size: As indicated on drawings.
   2. Insulation Thickness: 1-1/4 inch (31.8 mm), nominal.
   3. Thermal Resistance: R-value (RSI-value) of 4.2 (0.74) per inch, minimum, at 75 degrees F (24 degrees C), minimum, when tested according to ASTM C518.
   4. Provide enclosure with documented noise reduction coefficient (NRC) in accordance with ASTM C423 of at least 1.00 at 2 inches (51 mm) thick.
   5. Provide enclosure with documented ceiling attenuation class (CAC) in accordance with ASTM E1414/E1414M.
   6. Products:
      a. Specialty Products & Insulation (SPI); SafeLite: www.spi-co.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.4. ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.
   3. Temperature Resistance: Range of minus 40 to 212 degrees F (minus 40 to 100 degrees C).
   4. Products:
      a. SIGA Cover Inc; SIGA-Rissan: www.siga.swiss/global_en/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Flashing Tape: Special reinforced film with high performance adhesive.
   1. Application: Window and door opening flashing tape.
   2. Width: As required for application.
   3. Primer: Tape manufacturer's recommended product.
   4. Products:
      a. HUBER; ZIP SYSTEM FLASHING TAPE.

C. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
   1. Width: 3-1/2 inches (89 mm).
   2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.
   3. Products:
      a. OWENS CORNING; PROPINK COMFORTSEAL SILL GASKET.
      b. DOW; WEATHERMATE SILL SEAL.

c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Rigid Insulation Pronged Attachment Washers: Solid plastic cap washer with prongs and flexible perimeter seal attached with screws to substrate for attachment of rigid insulation and to help seal against air and moisture penetration through weather barrier assembly.

E. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
1. Length as required for thickness of insulation material and penetration of deck substrate.

F. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1. EXAMINATION

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

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2. BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Board Installation Over Roof Deck, General:
1. See applicable roofing specification section for specific board installation requirements.
2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
3. Do not apply more insulation than can be covered with roofing on the same day.

3.3. BATT INSTALLATION

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

B. Install in exterior wall and ceiling spaces without gaps or voids. Do not compress insulation.

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

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

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).
2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
3. Cooperate with ABAA testing agency.
4. Allow access to air barrier work areas and staging.
5. Do not cover air barrier work until tested, inspected, and accepted.

3.5. PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 21 19 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Foamed-in-place insulation.
   1. In underside of roofs and ceilings.

1.2. REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2025.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.3. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection as required by ABAA QAP.

E. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

C. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.6. FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Foamed-In-Place Insulation:
   1. BASF Corporation; WALLTITE US Series Closed Cell: www.spf.basf.com/#sle.
   2. Huntsman Building Solutions; PROSEAL: www.huntsmanbuildingsolutions.com/#sle.
   3. Johns Manville; JM IV HFO Closed-Cell: www.jm.com/#sle.
   4. Owens Corning; Natural Poymers Natural-Therm Pro Spray Polyurethane Foam: www.owenscorning.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. MATERIALS

A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Thermal Resistance: R-value (RSI-value) of 7.1 (1.25), minimum, per 1-inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature when tested in accordance with ASTM C518.
   2. Water Vapor Permeance: Vapor retarder; 2 perms (115 ng/(Pa s sq m)), maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
   3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
   4. Air Permeance: 0.04 cfm per square foot (0.2 L/(s/sq m)), maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf (75 Pa).
   5. Closed Cell Content: At least 90 percent.
   6. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   7. Products:
      a. BASF Corporation; WALLTITE US: www.spf.basf.com/#sle.
      b. Johns Manville; JM IV HFO Closed-cell: www.jm.com/#sle.
   8. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify work within construction spaces or crevices is complete before insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.2. PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.3. APPLICATION

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

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Apply to achieve a thermal resistance R-value of 38 (RSI-value of 6.7).

D. Do not apply cellulose fiber insulation in areas where temperatures exceed 150 degrees F (65.6 degrees C).

E. Patch damaged areas.

F. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

G. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Field inspections and tests will be performed by an independent testing agency.

C. Inspection will include verification of insulation thickness and density.

D. Coordination of ABAA Tests and Inspections:
   1. Provide testing and inspection required by ABAA QAP.
   2. Notify in ABAA writing of schedule for air barrier work. Allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

3.5. PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 24 00 - EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating, Class PB.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.

C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

D. ASTM C297/C297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions; 2016 (Reapproved 2024).

E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

F. ASTM C847 - Standard Specification for Metal Lath; 2018 (Reapproved 2024).

G. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2025a.

H. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage; 2025.

I. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2025.

J. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2025.

K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

N. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2025.

O. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2022.

P. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).

Q. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials; 2025.

R. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2009, with Editorial Revision (2022).

S. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies; 2015, with Editorial Revision (2022).

T. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2023, with Errata.

U. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2022.

V. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.

C. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.

D. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

E. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches (300 mm) square, illustrating project colors and textures.

F. Design Data: Indicate drawings and calculations sufficient to demonstrate compliance with applicable building code; signed and sealed by Engineer of Record for prefabricated panel systems.

G. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

H. Designer's qualification statement.

I. Installer's qualification statement.

1.5. QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer Qualifications: Company specializing in the type of work specified and with at least three years of documented experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Store materials as directed by manufacturer's written instructions.
1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F (4 degrees C) and temperatures in excess of 90 degrees F (32 degrees C).
2. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
3. Protect insulation materials from exposure to sunlight.

1.7. FIELD CONDITIONS

A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.

B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

C. Do not install coatings or sealants when ambient temperature is below 40 degrees F (5 degrees C).

D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

C. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than 5 years.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Basis of Design:
1. Dryvit Systems, Inc; Dryvit Outsulation Plus MD EIFS, Class PB with Moisture Drainage: www.dryvit.com/#sle.

B. Other Acceptable Exterior Insulation and Finish Systems Manufacturers:
1. Master Wall, Inc; Aggre-flex Drainage System - Class PB Drainage EIFS: www.masterwall.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. EXTERIOR INSULATION AND FINISH SYSTEM

A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on MECHANICALLY-FASTENED INSULATION BOARD WITH DRAINAGE GROOVES OVER ZIP SYSTEM INTEGRATED WATER-RESISTIVE BARRIER over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

B. Allowable Wind Loading: At least 188 psf (9000 Pa), positive and negative, determined in accordance with ICC-ES AC219 or ICC-ES AC235 using factor of safety of 3.0.

C. Fire Characteristics:
   1. Flammability: Pass, when tested in accordance with NFPA 285.
   2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
   3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot (mJ/sq m).

D. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi (105 kPa), when tested in accordance with ASTM C297/C297M.

E. Adhesion to Water-Resistive Coating: For each combination of insulation board and substrate, when tested in accordance with ASTM C297/C297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi (105 kPa) in all samples.

F. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf (299 Pa) differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

G. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.

H. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches (100 by 150 mm) in size.

I. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or ICC-ES AC235.

J. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycles 1, 5, or 9.

K. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.

L. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.

M. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons (500 liters) of sand.

N. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with ASTM E2486/E2486M:
   1. Standard: 25 to 49 in-lb (2.83 to 5.54 J), for areas not indicated as requiring higher impact resistance.

2.3. MATERIALS

A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Texture: Dryvit Systems, Inc, with Hydrophobic (HDP) Additive; Quarzputz HDP: www.dryvit.com/#sle.
   2. Color: As selected by Architect from manufacturer's standard range.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh, Class PB.

C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

D. Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.
   1. Grooved Board: Back side of board adjacent to sheathing grooved with vertical channels designed to allow moisture to drain; at drainage points provide board configuration that permits drainage to the exterior.
   2. Board Size: 24 by 48 inches (610 by 1220 mm).
   3. Board Size Tolerance: Plus/minus 1/16 inch (1.5 mm) from square and dimension.
   4. Board Thickness: 2 inches (50 mm).
   5. Board Edges: Square.
   6. Type and Thermal Resistance, R-value (RSI-value): Type II, 4.0 (0.70) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature using ASTM C177 test method.
   7. Type and Board Density: Type XI, 0.70 pcf (12 kg/cu m), minimum.
   8. Type and Compressive Resistance: Type XI, 5 psi (35 kPa), minimum.
   9. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.

2.4. ACCESSORIES

A. Insulation Adhesive: Type required by EIFS manufacturer for project substrate.

B. Insulation Fasteners: Fastener and plate system appropriate for substrate and as recommended by EIFS manufacturer.

C. Metal Lath: ASTM C847, self-furring galvanized diamond mesh, 2.5 lb/sq yd (1.4 kg/sq m).

D. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track and drainage accessories.

E. Sealant Materials: Compatible with EIFS materials and as recommended by EIFS manufacturer.

F. Exterior Soffit Vents: One piece, perforated, ASTM A653/A653M galvanized steel with G90 coating, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in (6 mm) when tested with a 10 ft (3 m) straightedge.

3.2. PREPARATION

A. Install self-furring metal lath over solid substrates that are deemed unacceptable to receive adhesively applied insulation. Install in accordance with ASTM C1063, except for butt-lapping instead of overlapping.
   1. Attach to concrete and concrete masonry using corrosion-resistant power or powder actuated fasteners or hardened concrete stub nails not less than 3/4 inch (19 mm) long and with heads not less than 3/8 inch (9.5 mm) wide. Ensure that fasteners are securely attached to substrate and spaced at maximum 16 inches (406 mm) on center horizontally and 7 inches (178 mm) vertically.

B. Apply primer to substrate as recommended by EIFS manufacturer for project conditions.

3.3. INSTALLATION - GENERAL

A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
   1. Where different requirements appear in either document, comply with the most stringent.
   2. Neither of these documents supercedes provisions of Contract Documents that defines contractual relationships between parties or scope of this work.

3.4. INSTALLATION - INSULATION

A. Install in accordance with manufacturer's instructions.

B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

D. On wall surfaces, install boards horizontally. On horizontal surfaces, install boards _____ .

E. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch (1.6 mm).

F. Fill gaps greater than 1/16 inch (1.6 mm) with strips or shims cut from the same insulation material.

G. Rasp irregularities off surface of installed insulation board.

H. Mechanical Fastening: Space fasteners as recommended by EIFS manufacturer.

3.5. INSTALLATION - CLASS PB FINISH

A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at terminations of EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
   1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches (64 mm).
   2. Allow base coat to dry a minimum of 24 hours before next coating application.

B. Install expansion joints at floor lines as recommended by EIFS manufacturer.

C. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.

D. Finish Coat Thickness: As recommended by manufacturer.

E. Seal control and expansion joints within the field of exterior finish and insulation system, using procedures recommended by sealant and finish system manufacturers.

3.6. CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.7. PROTECTION

A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Asphalt shingle roofing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Flashing.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Roof sheathing.

B. Section 07 21 00 - Thermal Insulation: Nailable rigid insulation.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Edge and cap flashings.

1.3. REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2025.

B. ASTM D3161/D3161M - Standard Test Method for Wind Resistance of Steep Slope Roofing Products (Fan-Induced Method); 2020 (Reapproved 2025).

C. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules; 2025.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

E. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2025.

F. ASTM F1667/F1667M - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2021a.

G. NRCA (RM) - The NRCA Roofing Manual; 2026.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.

C. Shop Drawings: For metal flashings, indicate specially configured metal flashings, jointing methods and locations, fastening methods and locations, and installation details.

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

E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.

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

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements for additional provisions.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of roofing systems similar to those required for this project, with not less than 5 years of documented experience.

B. Installer Qualifications: Company specializing in installing asphalt shingles, with at least 3 years of documented experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials with labels intact in manufacturer's unopened packaging until ready for installation.

B. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

C. Protect materials from harmful environmental elements, construction dust, direct sunlight, and other potentially detrimental conditions.

D. When storing roofing materials on roofing system ensure no damage occurs to supporting members and other materials.

1.7. FIELD CONDITIONS

A. Do not install shingles, eave protection membrane or underlayment when surface, ambient air, or wind chill temperatures are below 45 degrees F (7 degrees C).

1.8. WARRANTY

A. Provide 25-30 year manufacturer's warranty for coverage against black streaks caused by algae.

B. Provide 5-year manufacturer's warranty for wind damage.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Algae Resistant Asphalt Shingles:
1. Atlas Roofing Corporation; Pinnacle Pristane HP Architectural Shingles: www.atlasroofing.com/#sle.

2. CertainTeed Roofing; Landmark PRO Shingles: www.certainteed.com/#sle.
3. Malarkey Roofing; VistaAR: www.malarkeyroofing.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. ASPHALT SHINGLES

A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3462M.
1. Fire Resistance: Class A, complying with ASTM E108.
2. Wind Resistance: Class A, when tested in accordance with ASTM D3161/D3161M.
3. Warranted Wind Speed: Not greater than 60 mph (97 km/h).
4. Algae resistant.
5. Self-sealing type.
6. Color: As selected by Architect.

2.3. SHEET MATERIALS

A. Eave Protection Membrane:
1. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil (1 mm) total thickness; with strippable treated release paper and polyethylene sheet top surface.
2. Products:
a. HUBER; ZIP SYSTEM PEEL AND STICK UNDERLAYMENT.

B. Eave Edge Starter Shingles: Glass felt base, with ceramic coated mineral granules tightly embedded in refined, water-resistant asphalt, complying with ASTM D3462/D3462M.
1. Wind Resistance: Class F, when tested in accordance with ASTM D3161/D3161M.
2. Fire Resistance: Class A, complying with ASTM E108.
3. Shingle Size: 8-3/16 by 38-1/4 inches (208 by 972 mm), nominal.
4. Application: Roof with slope greater than 2 inches per foot (51 mm per 305 mm) and shingle exposure less than 5-5/8 inches (143 mm).
5. Products:
a. CertainTeed Roofing; SwiftStart Starter Shingles: www.certainteed.com/#sle.
b. Malarkey Roofing; Smart Start Starter Shingles: www.malarkeyroofing.com/#sle.
c. Atlas Roofing Corporation; PRO-CUT HP42 STARTER SHINGLES: www.atlasroofing.com/#sle..
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Underlayment: Self-adhering butyl-rubber sheet complying with ASTM D1970/D1970M; strippable release film.
1. Sheet Thickness: 40 mil (1 mm), minimum.
2. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
3. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
4. Water Vapor Permeance: 0.05 perm (0.30 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M, Procedure A (desiccant method).
5. Functional Temperature Range: From minus 45 degrees F (minus 43 degrees C) to 250 degrees F (121 degrees C).
6. Products:
a. HUBER; ZIP SYSTEM PEEL AND STICK UNDERLAYMENT.

2.4. FLASHING

A. Metal Flashing: Galvanized steel; see Section 07 62 00.

2.5. ACCESSORIES

A. Roofing Nails: Standard round wire shingle type, galvanized steel or stainless steel, minimum 3/8-inch (9.5 mm) head diameter, 12-gauge, 0.109-inch (2.77 mm) nail shank diameter, 1-1/2 inches (38 mm) long and complying with ASTM F1667/F1667M.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions prior to starting this work.

B. Verify roof deck is of sufficient thickness to accept fasteners.

C. Verify roof penetrations and plumbing stacks are in place and flashed to deck surface.

D. Verify roof openings are correctly framed.

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

3.2. PREPARATION

A. Seal roof deck joints wider than 1/16 inch (1.5 mm) as recommended by shingle manufacturer.

B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.

C. Broom clean deck surfaces before installing underlayment or eave protection.

D. Protect surrounding areas and adjacent surfaces from damage during execution of this work.

3.3. INSTALLATION

A. Eave Protection Membrane:
   1. Install eave protection membrane from eave edge to minimum 48 inches (1,220 mm) up-slope beyond interior face of exterior wall.
   2. Install eave protection membrane in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Underlayment:
   1. Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches (100 mm); stagger end laps of each consecutive layer, nail in place, and weather lap minimum 4 inches (100 mm) over eave protection.
   2. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

C. Metal Flashing:
   1. Install flashings in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
   2. Weather lap joints minimum 2 inches (50 mm) and seal weather tight with plastic cement.
   3. Secure in place with nails at ____ inches (____ mm) on center, and conceal fastenings.
   4. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

D. Shingles:

1. Install shingles in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
    a. Fasten individual shingles using two nails per shingle, or as required by manufacturer and local building code, whichever is greater.
    b. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.
2. Place shingles in straight coursing pattern with 5-inch (125 mm) weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.
3. Project first course of shingles 3/4 inch (19 mm) beyond fascia boards.
4. Extend shingles 1/2 inch (13 mm) beyond face of gable edge fascia boards.
5. Coordinate installation of roof mounted components or work projecting through roof with weathertight placement of counterflashings.
6. Complete installation to provide weathertight service.

3.4. CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed work upon completion of installation; remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to finish.

3.5. PROTECTION

A. Do not permit traffic over finished roof surface; protect roofing until completion of project.

B. Touch-up, repair, or replace damaged asphalt shingles or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 46 46 - FIBER-CEMENT SIDING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Fiber-cement siding.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Siding substrate.

B. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.3. REFERENCE STANDARDS

A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2026.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.

C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.

D. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.

H. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified in this section with not less than three years of experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.

C. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

D. Protect materials from harmful environmental elements, construction dust, and other potentially detrimental conditions.

1.7. FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer warranty for years as indicated under Fiber-Cement Siding article sub-headings for "Warranty". Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1. FIBER-CEMENT SIDING

A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
1. Style: Standard lap style.
2. Texture: Smooth.
3. Length: 12 feet (3.7 m), nominal.
4. Width (Height): 5-1/4 inches (133 mm).
5. Thickness: 5/16 inch (8 mm), nominal.
6. Finish: Factory applied topcoat.
7. Color: As selected by Architect from manufacturers full range of available colors.
8. Warranty: 30 year limited; transferable.
9. Products:
   a. James Hardie Building Products, Inc; HARDIE PLANK LAP SIDING: www.jameshardie.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
1. Texture: Smooth.
2. Length: 96 inches (2440 mm), nominal.
3. Width: 24 inches (610 mm).
4. Thickness: 1/4 inch (6.35 mm), nominal.
5. Finish: Factory applied topcoat.
6. Color: As selected by Architect from manufacturers full range of available colors.
7. Manufacturer: Same as siding.

2.2. ACCESSORIES

A. Trim: Same material and texture as siding.

B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches (31.8 mm), minimum.

C. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

PART 3 EXECUTION

3.1. EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that water-resistant barrier has been installed over substrate completely and correctly; see Section 06 10 00.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2. PREPARATION

A. Protect surrounding areas and adjacent surfaces during execution of this work.

B. Install Sheet Metal Flashing:
1. Above door and window trim and casings.
2. Above horizontal trim in field of siding.

3.3. INSTALLATION

A. Install siding in accordance with manufacturer's instructions and recommendations.
1. Read warranty and comply with terms necessary to maintain warranty coverage.
2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
3. Use trim details as indicated on drawings.
4. Touch up field cut edges before installing.
5. Pre-drill nail holes if necessary to prevent breakage.

B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.

C. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.

D. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.

E. Do not install siding less than 6 inches (152 mm) from ground surface, or closer than 1 inch (25.4 mm) to roofs, patios, porches, and other surfaces where water may collect.

F. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.4. CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean faced panels in accordance with manufacturer’s maintenance instructions, using cleaning materials and methods acceptable to manufacturer.

3.5. PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 54 00 - THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Adhered system with thermoplastic roofing membrane.

B. Insulation, flat and tapered.

C. Cover boards.

D. Flashings.

E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ASTM D6083/D6083M - Standard Specification for Liquid-Applied Acrylic Coating Used in Roofing; 2024.

B. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing; 2026.

C. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2024.

D. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2026).

E. NRCA (RM) - The NRCA Roofing Manual; 2026.

F. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, surfacing, and fasteners.

C. Shop Drawings: Submit drawings that indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

D. Samples for Verification: Submit two samples 12 by 12 inches (304.8 by 304.8 mm) in size illustrating colored coating.

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

F. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

G. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

J. Specimen Warranty: For approval.

K. Warranty Documentation:
1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
2. Submit installer's written verification that installation complies with warranty conditions for waterproof membrane.

1.6. 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 this section with at least three years of documented experience.

1.7. DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact, unless otherwise indicated.

C. Store materials in weather protected environment, clear of ground and moisture.

D. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

E. Protect foam insulation from direct exposure to sunlight.

1.8. FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above 95 degrees F (35 degrees C).

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.9. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Material Warranty: Provide membrane manufacturer's warranty agreeing to replace material that shows manufacturing defects within five years after installation.

C. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.
   3. Exceptions are not Permitted:
      a. Damage due to roof traffic.
      b. Damage due to wind speed greater than 56 miles per hour (90 km/h) but less than 90 miles per hour (145 km/h).

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
   1. Elevate; UltraPly TPO SA (Self-Adhering) Membrane: www.holcimelevate.com/#sle.
   2. GAF; EverGuard SA TPO Self-Adhered Roof Membrane: www.gaf.com/#sle.
   3. Johns Manville; JM TPO SA - 60 mil: www.jm.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation:
   1. Elevate Commercial Building Products; ISOGARD: www.elevatecommercialbp.com/#sle.
   2. GAF; ENERGYGUARD: www.gaf.com/#sle.
   3. Johns Manville; ENRGY 3 GCF: www.jm.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

C. Cover Boards:
   1. GAF; USG SECUROCK BRAND ULTRALIGHT COATED GLASS MAT-ROOF BOARD: www.gaf.com/#sle.
   2. Johns Manville; DENSDECK PRIME ROOF BOARD: www.jm.com/#sle.
   3. Georgia-Pacific; DensDeck Prime with EONIC Technology: www.densdeck.com/#sle..
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. ROOFING - UNBALLASTED APPLICATIONS

A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.

B. Roofing Assembly Requirements:
   1. Solar Reflectance Index (SRI): Minimum of 64 based on three-year aged value; if three-year aged data is not available, minimum of 82 initial value.
      a. Calculate SRI in accordance with ASTM E1980.
      b. Field applied coating may not be used to achieve specified SRI.

C. Acceptable Insulation Types - Constant Thickness Application: SEE SECTION 07 21 00 - THERMAL INSULATION # .

D. Acceptable Insulation Types - Tapered Application: SEE SECTION 07 21 00 - THERMAL INSULATION # .

E. Surfacing: Colored roof coating.

F. Roof Coating: Water-based acrylic elastomeric roof coating complying with ASTM D6083/D6083M.
   1. Color: As selected by Architect.
   2. Dry Film Thickness (DFT) over Elastomeric Roofing: Two coats, 12 mil, 0.012 inch (0.30 mm) thick per coat, minimum.
   3. Products:
      a. GAF; ACRYLIC TOP COAT.
      b. Henry; 587 DURA-BRITE.
      c. Karnak; 406 TRU-GRIP BASE COAT & ELASTO-BRITE ACRYLIC TOPCOAT.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. MEMBRANE ROOFING AND ASSOCIATED MATERIALS

A. Membrane Roofing Materials:
   1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrims.
      a. Thickness: 60 mil, 0.060 inch (1.5 mm), minimum.
   2. Sheet Width: Factory fabricated into widest possible sheets.
      a. Adhered Application: Limit width to 120 inches (3,048 mm), maximum, when ambient temperatures are less than 40 degrees F (4.4 degress C) for extended period of time during installation.
   3. Color: As selected by Architect from manufacturer's full color range.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

D. Flexible Flashing Material: Material recommended by membrane manufacturer.

E. Separation Sheet: Sheet polyethylene; 2 mil, 0.002 inch (0.05 mm) thick.

2.4. ACCESSORIES

A. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (152 mm) wide; self adhering.

B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.

C. Membrane Adhesive: As recommended by membrane manufacturer.

D. Insulation Adhesive: As recommended by insulation manufacturer.

E. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
   1. Composition: Asphaltic with mineral granule surface.
   2. Surface Color: White, Yellow, or GRAY.
   3. Products:
      a. Johns Manville; JM TPO WALKPAD: www.jm.com/#sle.
      b. GAF; EVERGUARD TPO WALKWAY ROLL: www.gaf.com/#sle..
      c. ELEVATE; ULTRAPLY / X-TRED TPO WALKWAY PADS: www.holcimelevate.com/#sle..
      d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.2. PREPARATION - WOOD DECK

A. Verify flatness and tightness of joints in wood decking; fill knot holes with latex filler.

B. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.3. INSTALLATION, GENERAL

A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.

B. Do not apply roofing membrane during cold or wet weather conditions.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Coordinate this work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

3.4. INSTALLATION - INSULATION, UNDER MEMBRANE

A. Attachment of Insulation:
   1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM DS 1-28 Factory Mutual requirements.
   2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inches (152 mm) from joints of preceding layer.

C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

E. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

F. At roof drains, use boards cut to slope to slope down to roof drains over a distance of 18 inches (457 mm).

G. Do not install more insulation than can be covered with membrane in same day.

3.5. INSTALLATION - MEMBRANE

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate at rate of 0.008-0.016 gallons per square foot (___ L/sq m). Fully embed membrane in adhesive except in areas directly over or within 3 inches (76 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (76 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
1. Extend membrane over cant strips and up a minimum of 4 inches (102 mm) onto vertical surfaces.
2. Fully adhere flexible flashing over membrane and up to nailing strips.
3. Secure flashing to nailing strips at 4 inches (102 mm) on center.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Install roofing expansion joints. Make joints watertight.
1. Install prefabricated joint components in accordance with manufacturer's instructions.

H. Coordinate installation of roof drains and sumps and related flashings.

3.6. INSTALLATION - MEMBRANE FINISH COATING

A. Install finish coating to membrane and flashing surfaces exposed to view, in accordance with manufacturer's instructions.
1. Prime membrane.
2. Apply 2-3 coats to minimum dry film thickness (DFT) of 20-30 mil, 0.02-0.03 inch (___ mm).
3. Finish with colored coating.

B. Install walkway pads. Space pad joints to permit drainage.

3.7. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Owner will provide testing services, and Contractor to provide temporary construction and materials for testing in accordance with requirements.

C. Provide daily on-site attendance of roofing and insulation manufacturer's representative during installation of this work.

3.8. CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Remove bituminous markings from finished surfaces.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.9. PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Fabricated sheet metal items, including counterflashings, gutters, and downspouts.

B. Sealants for joints within sheet metal fabrications.

C. Precast concrete splash pads.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

F. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples, 12 by 12 inches (___ by ___ mm) in size, illustrating metal finish color.

1.6. QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

1.7. DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1. SHEET MATERIALS

A. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 0.032 inch (0.81 mm) thick; anodized finish of color as selected.
1. Color Anodized Finish: AAMA 611, AA-M12C22A42/44, Class I, integrally or electrolytically colored anodic coating not less than 0.7 mil, 0.0007 inch (0.018 mm) thick.
a. Color: As selected by Architect from manufacturer's standard colors.

B. Stainless Steel: ASTM A666/A666M, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch (0.40 mm) thick; smooth No. 4 - Brushed finish.

2.2. PREFINISHED ALUMINUM SHEETS

A. Description: Factory-applied topcoat systems applied to aluminum flat sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed side and backing coats on unexposed side.

B. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.

C. Application: Coping Caps, Parapet Caps, Counterflashing, Fascia, Drip Fascia, Edge Fascia, Gutters, Downspouts, and Scuppers.
1. Drawing Detail: SMACNA (ASMM), _____.
2. Coating System: High-performance organic coating system.
3. Color: As selected by Architect from manufacturer's standard colors.

2.3. FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch (450 mm) long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

2.4. GUTTERS AND DOWNSPOUTS

A. Gutters: H-STYLE Rectangular profile.

B. Downspouts: Rectangular profile.

C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).

D. Accessories: Profiled to suit gutters and downspouts.
1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.

E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

F. Downspout Boots: Plastic.

G. Downspout Extenders: Same material and finish as downspouts.

H. Seal metal joints.

2.5. ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer Type: Zinc chromate.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
1. Products:
a. Franklin International, Inc; Titebond WeatherMaster Metal Roof Sealant: www.titebond.com/#sle.
b. H.B. Fuller Construction Products Inc; ElastiSeal B-100: www.hbfullerproducts.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2. PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.38 mm).

3.3. INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

E. Secure gutters and downspouts in place with concealed fasteners.

F. Slope gutters 1/4 inch per 10 feet (2.1 mm per m), minimum.

G. Connect downspouts to downspout boots, and grout connection watertight.

H. Set splash pads under downspouts, and set in place with _____.

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 91 00 - PREFORMED JOINT SEALS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Precompressed foam seals.

1.2. RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Liquid and mastic joint sealants and their backing materials.

1.3. REFERENCE STANDARDS

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.

C. Color Cards: For color selection.

D. Samples for Color Selection: 4 inch (102 mm) long pieces of each color available; at least 2 samples of each color.

E. Manufacturer's Qualification Statement.

F. Installer's Qualification Statement.

1.5. QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing work of the type specified in this section with at least three years of documented experience.

1.6. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective work within a two year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Precompressed Foam Seals:
   1. Sika Emseal: www.emseal.com/#sle.
   2. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. PRECOMPRESSED FOAM SEALS

A. Precompressed Foam Seal: Comprised of open-cell polyurethane foam impregnated with water-repellent, and with self-adhesive faces protected prior to installation by release paper.
   1. Color: As selected by Architect.
   2. Size as required to provide watertight seal when installed.
   3. Calculate size according to manufacturer's recommendations.
   4. Measure size of existing joints before selecting seal width.
   5. Applications:
      a. Exterior wall expansion joints.
      b. Building facade with seismic constraints.
   6. Products:
      a. Sika Emseal; Seismic Colorseal: www.emseal.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. ACCESSORIES

A. Adhesive: As recommended by seal manufacturer.

B. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and strip seal.

C. Substrate Cleaner: Non-corrosive, non-staining type recommended by seal manufacturer; compatible with joint forming materials.

D. Primer: Type recommended by seal manufacturer to suit application; non-staining.

E. Backing Tape: Self-adhesive polyethylene tape with surface that seal will not adhere to.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that joints are ready to receive this work.

B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

3.2. PREPARATION

A. Properly prepare construction components adjacent to the work of this section to prevent damage and disfigurement due to this work.

3.3. INSTALLATION

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

B. Precompressed Foam Seals:
   1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
   2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
   3. Remove loose materials and foreign matter that could impair adhesion of sealant.
   4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.

3.4. CLEANING

A. Clean adjacent soiled surfaces.

3.5. PROTECTION

A. Protect joints from damage until adhesives have properly cured.

END OF SECTION

SECTION 07 92 00 - JOINT SEALANTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

D. Owner-provided field quality control.

1.2. RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Section 07 91 00 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.

C. Section 09 30 00 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.3. REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).

C. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).

D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2024.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

I. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

J. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

K. SWRI (VAL) - SWR Institute Validated Products Directory; Current Edition.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Backing material recommended by sealant manufacturer.
4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
5. Substrates the product should not be used on.
6. Substrates for which use of primer is required.
7. Substrates for which laboratory adhesion and/or compatibility testing is required.
8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
9. Sample product warranty.
10. Certification by manufacturer indicating that product complies with specification requirements.
11. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Executed warranty.

1.5. QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
1. Adhesion Testing: In accordance with ASTM C794.
2. Compatibility Testing: In accordance with ASTM C1087.
3. Stain Testing: In accordance with ASTM C1248; required only for masonry substrates.
4. Allow sufficient time for testing to avoid delaying the work.
5. Deliver sufficient samples to manufacturer for testing.
6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

1.6. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Nonsag Sealants:
1. Pecora Corporation: www.pecora.com/#sle.
2. Sika Corporation: usa.sika.com/#sle.
3. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Self-Leveling Sealants:
1. Pecora Corporation: www.pecora.com/#sle.
2. Sika Corporation: usa.sika.com/#sle.
3. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints:
a. Seal the following joints:
1) Wall expansion and control joints.
2) Joints between doors, windows, and other frames or adjacent construction.
3) Joints between different exposed materials.
2. Interior Joints:
a. Do not seal gaps and openings in gypsum board and suspended ceilings
b. Seal the following joints:
1) Joints between door frames and window frames and adjacent construction.
3. Do Not Seal:
a. Intentional weep holes in masonry.
b. Joints indicated to be covered with expansion joint cover assemblies.
c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
d. Joints where sealant installation is specified in other sections.
e. Joints between suspended ceilings and walls.

B. Exterior Joints: Use nonsag nonstaining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
1. Wall and Ceiling Joints in Nonwet Areas: Acrylic emulsion latex sealant.

2. Wall and Ceiling Joints in Wet Areas: Nonsag polyurethane sealant for continuous liquid immersion.
3. Floor Joints in Wet Areas: Nonsag polyurethane non-traffic-grade sealant suitable for continuous liquid immersion.
4. Joints between Tile in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
5. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.

D. Interior Wet Areas: restrooms, kitchens, and food service areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

E. Preformed Joint Seals: See Section 07 91 00 for information.

2.3. JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

2.4. NONSAG JOINT SEALANTS

A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M, A, G, and O; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
5. Color: To be selected by Architect from manufacturer's standard range.
6. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).
7. Products:
   a. Pecora Corporation; Pecora 895 NST (Non-Staining Technology): www.pecora.com/#sle.
   b. Sika Corporation; Sikasil WS-295: usa.sika.com/#sle.
   c. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
   d. Tremco Commercial Sealants & Waterproofing; Tremsil 200: www.tremcosealants.com/#sle.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.
2. Products:
   a. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
   b. Sika Corporation; Sikasil N Plus US: usa.sika.com/#sle.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
5. Products:
   a. Pecora Corporation; DynaTrol II: www.pecora.com/#sle.
   b. Sika Corporation; Sikaflex-2c NS EZ Mix+: usa.sika.com/#sle.

c. Tremco Commercial Sealants & Waterproofing; Dymonic 100: www.tremcosealants.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
1. Movement Capability: Plus and minus 35 percent, minimum.
2. Water Compatibility: Non-Potable.
3. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
4. Color: To be selected by Architect from manufacturer's standard range.
5. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
6. Products:
a. Sika Corporation; Sikaflex-2c NS EZ Mix+: usa.sika.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

E. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
3. Products:
a. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
b. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

2.5. SELF-LEVELING JOINT SEALANTS

A. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
1. Composition: Multicomponent, 100 percent solids by weight.
2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
3. Color: To be selected by Architect from manufacturer's standard colors.
4. Joint Width, Minimum: 1/8 inch (3 mm).
5. Products:
a. Pecora Corporation; DynaThane 800HM: www.pecora.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.6. ACCESSORIES

A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

B. Preformed Extruded Silicone Joint Seal: Pre-cured low-modulus silicone extrusion, in sizes to fit applications indicated on drawings, combined with a neutral-curing liquid silicone sealant for bonding joint seal to substrates.
1. Size: 1 inch (25.4 mm) wide, in rolls 100 feet (30.5 m) long.
2. Thickness: 0.78 inch (19.8 mm), with ridges along outside bottom edges for bonding area.
3. Color: As selected by Architect..
4. Durometer Hardness, Type A: 26 to 32, minimum, when tested in accordance with ASTM D2240.
5. Tensile Strength: 218 psi (1.5 MPa), in accordance with ASTM D412.

6. Elongation at Break: 554 percent, in accordance with ASTM D412.
7. Products:
   a. Tremco Commercial Sealants & Waterproofing; Spectrem Simple Seal: www.tremcosealants.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

D. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

E. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

F. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.2. PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.3. INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Install acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

C. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet (30 linear m), notify Architect immediately.

D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.5. POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Thermally insulated hollow metal doors with frames.

D. Hollow metal borrowed lites glazing frames.

1.2. RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

B. Section 08 80 00 - Glazing.

C. Section 09 91 13 - Exterior Painting.

D. Section 09 91 23 - Interior Painting.

1.3. ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. HMMA: Hollow Metal Manufacturers Association.

C. NAAMM: National Association of Architectural Metal Manufacturers.

D. UL: Underwriters Laboratories.

1.4. REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2026.

C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2024.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

I. ASTM C143/C143M - Standard Test Method for Slump of Concrete; 2026b.

J. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

K. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.

L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.

O. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

Q. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2026.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Samples: Submit two samples of metal, 2 by 2 inches (51 by 51 mm) in size, showing factory finishes, colors, and surface texture.

E. Design Submittals: Manufacturer to submit anchor design analysis calculations for blast-resistant doors signed and sealed by specialty design engineer experienced in this type of work and licensed in the State in which the Project is located.

F. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

G. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

1.6. QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: https://steeldoor.org/sdi-certified/#sle.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Maintain at project site copies of reference standards relating to installation of products specified.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Hollow Metal Doors and Frames:
1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
2. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
3. Steelcraft, an Allegion brand: www.allegion.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Door Edge Profile: Manufacturers standard for application indicated.
4. Typical Door Face Sheets: Flush. Refer to Door Schedule for additional information.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.

B. Hollow Metal Panels: Same construction, performance, and finish as doors.

C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.3. HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
a. Level 3 - Extra Heavy-duty.
b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
c. Model 2 - Seamless.
d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thermal Resistance: R-Value of 6.0 minimum, for installed thickness of polystyrene.
4. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
5. Weatherstripping: See Section 08 71 00.

2.4. HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Full profile/continuously welded type.
1. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
2. Weatherstripping: See Section 08 71 00.

D. Interior Door Frames, Non-Fire Rated: Slip-on type at gypsum board walls, and knock-down type at masonry walls.
1. Terminated Stops: Provide at DOORS CONFIRMED BY ARCHITECT FOR FOOD PROCESSING / SERVICES; closed end stop terminated 6 inch (150 mm), maximum, above floor at 45 degree angle.
2. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.

E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

G. Transom Bars: Fixed, of profile same as jamb and head.

H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (102 mm) high to fill opening without cutting masonry units.

J. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.5. FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.6. ACCESSORIES

A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
   1. Size: AS INDICATED BY SELECTED DOOR MANUFACTURER FOR HALF-GLASS DESIGN TYPE.
   2. Frame Material: 14 gauge, 0.067 inch (1.70 mm), stainless steel.
   3. Metal Finish: Gray polyester powder coating.
   4. Glazing: 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.

B. Glazing: As specified in Section 08 80 00, factory installed.

C. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.

D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

E. Silencers: Resilient rubber, IVES SR65; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.2. PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3. INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install prefinished frames after painting and wall finishes are complete.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 08 71 00.
   1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

F. Comply with glazing installation requirements of Section 08 80 00.

G. Coordinate installation of electrical connections to electrical hardware items.

H. Touch up damaged factory finishes.

3.4. TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.5. ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Flush wood doors; flush configuration; non-rated.

1.2. RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

B. Section 08 71 00 - Door Hardware.

1.3. REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   2. Include certification program label.

D. Samples: Submit two samples of door veneer, 8 by 10 inches (203.2 by 254 mm) in size illustrating wood grain, stain color, and sheen.

E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

F. Manufacturer's Installation Instructions: Indicate special installation instructions.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Specimen warranty.

J. Warranty, executed in Owner's name.

1.5. QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
1. Company with at least one project within past five years with value of woodwork within at least 20 percent of cost of woodwork for this project.
2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Woodwork Quality Assurance Program:
1. Comply with AWI (QCP) woodwork association quality assurance service/program in accordance with requirements for work specified in this section; www.awiqcp.org/#sle.
2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by quality assurance program.
4. Provide designated labels on installed products as required by quality assurance program.
5. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Wood Veneer Faced Doors:
1. Lynden Door, Inc: www.lyndendoor.com/#sle.
2. Oregon Door: www.oregondoor.com/#sle.
3. VT Industries, Inc: www.vtindustries.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL) Faced Doors:
1. Lynden Door, Inc: www.lyndendoor.com/#sle.

2. Oregon Door: www.oregondoor.com/#sle.
3. VT Industries, Inc: www.vtindustries.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.
1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
3. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
1. Provide solid core doors at each location.
2. Wood veneer facing with factory opaque finish.
3. High pressure decorative laminate (HPDL) finish.

2.3. DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.4. DOOR FACINGS

A. Veneer Facing for Opaque Finish: Closed grain hardwood veneer, in compliance with indicated quality standard.

B. High Pressure Decorative Laminate (HPDL) Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; color as selected; textured, low gloss finish.

C. Facing Adhesive: Type I - waterproof.

2.5. DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
1. Provide solid blocks at lock edge for hardware reinforcement.
2. Provide solid blocking for other throughbolted hardware.

C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
1. Exception: Doors to be field finished.

F. Provide edge clearances in accordance with the quality standard specified.

2.6. FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Flat.
   2. Opaque:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Color: As selected by Architect.
      c. Sheen: Flat.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

2.7. ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 11 13.

B. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2. INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.3. TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4. ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 31 00 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Wall-mounted access units.

1.2. REFERENCE STANDARDS

1.3. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Project Record Documents: Record actual locations of each access unit.

1.4. QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

PART 2 PRODUCTS

2.1. ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units:
   1. Location: As indicated on drawings.
   2. Panel Material: Aluminum.
   3. Size: 30 by 30 inches (762 by 762 mm).
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   5. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.

2.2. WALL-MOUNTED ACCESS UNITS

A. Manufacturers:
   1. Best Access Doors: www.bestaccessdoors.com/#sle.

a. Insulated Access Panel: Best Access Doors; BA-XTA.

2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2. PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3. INSTALLATION

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

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 33 13 - COILING COUNTER DOORS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Non-fire-rated coiling counter doors and operating hardware.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Rough openings.

B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 09 21 16 - Gypsum Board Assemblies: Rough openings.

1.3. REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.

C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

D. Samples: Two slats, 4 inches long (102 mm long), illustrating shape, color, and finish texture.

E. Manufacturer's Installation Instructions: Indicate installation sequence and installation, adjustment, and alignment procedures.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Specimen warranty.

I. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

J. Project Record Documents: Include as-built electrical diagrams for electrical operation and connection to fire alarm system.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the 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 documented experience.

1.6. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for counterbalance shaft assembly. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Coiling Counter Doors:
1. Overhead Door Corporation; Counter Door - Model 651 : www.overheaddoor.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. COILING COUNTER DOORS

A. Coiling Counter Metal Doors, Non-Fire-Rated: Stainless steel slat curtain.
1. Mounting: Interior face mounted.
2. Nominal Slat Size: 1-1/2 inches (38.1 mm) wide.
3. Slat Profile: Flat, perforated.
4. Finish, Stainless Steel: No. 4 - Brushed.
5. Color: As selected by Architect from manufacturer's standard range.
6. Guides: Formed track; same material and finish unless otherwise indicated.
7. Hood Enclosure: Manufacturer's standard; primed steel.
8. Locking Devices: Slide bolt on inside.

2.3. COMPONENTS

A. Metal Curtain Construction: Interlocking, single-thickness slats.
1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
3. Stainless Steel Slats: ASTM A666/A666M, Type 304; minimum thickness 22 gauge, 0.03 inch (0.8 mm).

B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
1. Stainless Steel Guides: ASTM A666, Type 304, rollable temper.

C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.

D. Lock Hardware:
1. Latch Handle: Manufacturer's standard.
2. Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.

E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that adjacent construction is suitable for door installation.

B. Verify that door opening is plumb, header is level, and dimensions are correct.

C. Notify Architect of any unacceptable conditions or varying dimensions.

D. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.2. INSTALLATION

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

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

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

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.3. TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch (1.5 mm).

C. Maximum Variation From Level: 1/16 inch (1.5 mm).

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft (3 mm per 3 m) straight edge.

3.4. ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.5. CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 43 13 - ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.2. RELATED REQUIREMENTS

A. Section 08 42 29 - Automatic Entrances.

B. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

C. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3. REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.

C. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2024.

D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

E. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

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. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2026.

K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

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 2023).

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 (Reapproved 2023).

O. FLA (PAD) - Florida Building Code Online - Product Approval Directory; Current Edition.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Samples: Submit two samples 12X12 inches (____x____ mm) in size illustrating finished aluminum surface, glass, infill panels, glazing materials.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

G. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

I. Designer's qualification statement.

J. Manufacturer's qualification statement.

K. Installer's qualification statement.

L. Specimen warranty.

1.6. QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of professional structural engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.
1. Provide certified glass products through ANSI-accredited certifications that include plant audits and independent laboratory performance testing.

C. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI-accredited certifications in appropriate categories for work specified.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8. FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

1.9. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five 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 five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Aluminum-Framed Storefronts:
   1. Kawneer North America; TRIFAB VERSAGLAZE 451T: www.kawneer.com/#sle.
   2. Oldcastle BuildingEnvelope; 3000 SERIES THERMAL MULTIPLANE/3000XT: www.oldcastlebe.com/#sle.
   3. Trulite Glass & Aluminum Solutions, LLC; CT451: www.trulite.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Entrance Doors:
   1. Trulite Glass & Aluminum Solutions, LLC; SERIES 300 STANDARD: www.trulite.com/#sle.
   2. Kawneer North America; 350 STANDARD.
   3. Oldcastle BuildingEnvelope; MS-375 STANDARD.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken:
   1. Basis of Design: Kawneer North America; TRIFAB VERSAGLAZE 451T.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).

2.3. BASIS OF DESIGN -- SWINGING DOORS

A. Entrance Doors, Various Stile Widths:
1. Basis of Design: Kawneer North America; 350 STANDARD.
2. Thickness: 1-3/4 inches (43 mm).

2.4. ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
1. Unitized, shop assembly.
2. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
4. Finish: Superior performing organic coatings.
a. Factory finish all surfaces that will be exposed in completed assemblies.
b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
5. Finish Color: As selected by Architect from manufacturer's standard line.
6. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
8. 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.
9. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
10. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
11. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
12. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.
13. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.

B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
a. Design Wind Loads: Comply with requirements of ASCE 7.
b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, having Florida Building Code FLA (PAD) approval for Large and Small Missile impact and pressure cycling at design wind pressure.
3. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf (390 Pa).
4. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.
5. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.

C. Products:
1. Trulite Glass & Aluminum Solutions, LLC; CT451 2" X 4-1/2" Thermal for 1" Glass: www.trulite.com/#sle.
2. Kawneer North America; TRIFAB VERSAGLAZE 451T.
3. Oldcastle BuildingEnvelope; 3000 SERIES THERMAL MULTIPLANE/3000XT.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.5. COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
2. Glazing Stops: Flush.
3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Glazing: See Section 08 80 00.

C. Swing Doors: Glazed aluminum.
1. Thickness: 1-3/4 inches (43 mm).
2. Top Rail: 4 inches (100 mm) wide.
3. Vertical Stiles: 4-1/2 inches (115 mm) wide.
4. Bottom Rail: 10 inches (254 mm) wide.
5. Glazing Stops: Square.
6. Finish: Same as storefront.
7. Products:
a. Trulite Glass & Aluminum Solutions, LLC; Series 300: www.trulite.com/#sle.
b. Kawneer North America; 350 STANDARD.
c. Oldcastle BuildingEnvelope; MS-375 STANDARD.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.6. MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch (0.48 mm) minimum thickness.

D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

E. Glazing Accessories: See Section 08 80 00.

2.7. 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. Color: As selected by Architect from manufacturer's standard range.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.8. HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Other Door Hardware: See Section 08 71 00.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all exterior doors.

D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all exterior doors.

E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all exterior doors.

F. Automatic Door Operators and Actuators: See Section 08 42 29.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2. INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 08 80 00.

K. Install applied muntin grid assembly in accordance with manufacturer's instructions.

L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3. TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

3.4. FIELD QUALITY CONTROL

A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.

B. See Section 01 40 00 - Quality Requirements for general testing and inspection requirements.

C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
1. Perform a minimum of two tests in each designated area as indicated on drawings.
2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

D. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
1. Perform a minimum of two tests in each designated area as indicated on drawings.
2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf (200 Pa).
    a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce (14 gram) that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf (75 Pa).
    a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft (0.5 L/s sq m).

E. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5. ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6. CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.7. PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
   a. "Metal Doors and Frames"
   b. "Flush Wood Doors"
   c. "Stile and Rail Wood Doors"
   d. "Interior Aluminum Doors and Frames"
   e. "Aluminum-Framed Entrances and Storefronts"
   f. "Stainless Steel Doors and Frames"
   g. "Special Function Doors"
   h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
   a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.
      3) Point-to-point wiring.
      4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
c. Indicate complete designations of each item required for each opening, include:
    1) Door Index: door number, heading number, and Architect's hardware set number.
    2) Quantity, type, style, function, size, and finish of each hardware item.
    3) Name and manufacturer of each item.
    4) Fastenings and other pertinent information.
    5) Location of each hardware set cross-referenced to indications on Drawings.
    6) Explanation of all abbreviations, symbols, and codes contained in schedule.
    7) Mounting locations for hardware.
    8) Door and frame sizes and materials.
    9) Degree of door swing and handing.
    10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:
    a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
    b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
    c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
    d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
    e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
    f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
    a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
    a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    b. Catalog pages for each product.
    c. Final approved hardware schedule edited to reflect conditions as installed.
    d. Final keying schedule
    e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
    f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
   a. Fire door assemblies, in compliance with NFPA 80.
   b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   a. For door hardware: DHI certified AHC or DHC.
   b. Can provide installation and technical data to Architect and other related subcontractors.
   c. Can inspect and verify components are in working order upon completion of installation.
   d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
   a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
   b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
   a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
   b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware
   a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
   a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      2) Preliminary key system schematic diagram.
      3) Requirements for key control system.
      4) Requirements for access control.
      5) Address for delivery of keys.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Inspect and discuss preparatory work performed by other trades.
   c. Inspect and discuss electrical roughing-in for electrified door hardware.
   d. Review sequence of operation for each type of electrified door hardware.
   e. Review required testing, inspecting, and certifying procedures.
   f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:
   a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
    a. Mechanical Warranty
        1) Locks
            a) Falcon: 10 years
        2) Exit Devices
            a) Falcon: 10 years
        3) Closers
            a) Falcon SC Series: 10 years
        4) Automatic Operators
            a) LCN: 2 years
    b. Electrical Warranty
        1) Exit Devices
            a) Falcon: 1 Year
        2) Automatic Operators
            a) LCN: 2 years

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series

2. Acceptable Manufacturers and Products:
   a. McKinney TB series
   b. Best FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Von Duprin EPT-10

2. Acceptable Manufacturers and Products:
   a. ABH PT1000
   b. Precision EPT-12C

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.05 PIVOT SETS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Rixson
   b. ABH

B. Requirements:

1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide appropriate model where pivot sets are scheduled at fire rated openings.
4. Provide pivots with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer, then provide recommended power transfer device and appropriate quantity of pivots.
5. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.06 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon TM series

2. Acceptable Manufacturers and Products:
   a. Arrow QL series
   b. Corbin-Russwin CL3300 series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
   a. Lever Design: Dane

2.07 DEADBOLTS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon D200 Series

2. Acceptable Manufacturers and Products:
   a. Arrow E Series
   b. Corbin-Russwin DL2200/DL3200 Series

B. Requirements:

1. Provide grade 2 deadbolt series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
4. Provide manufacturer's standard strike.

2.08 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon 24/25 series

2. Acceptable Manufacturers and Products:
   a. Sargent 19-43-GL-80 series
   b. Precision Apex series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.09 ELECTRONIC ACCESS CONTROL LOCKSETS AND EXIT DEVICE TRIM

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Schlage CO Series

2. Acceptable Manufacturers and Products:

B. Requirements:

1. Provide offline electronic access control products that comply with the following requirements:
   a. Listed, UL 294 - The Standard of Safety for Access Control System Units.
   b. Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security.
   c. Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.
   d. Compliant with ASTM E330 for door assemblies.
   e. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada RSS-210.

2. Functions: Provide functions as scheduled that are field configurable without taking the offline electronic product off the door.
3. Emergency Override: Provide mechanical key override; cylinders: Refer to "KEYING" article, herein.
4. Levers:
   a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked, preventing damage to internal lock components from vandalism by excessive force.
   b. Provide pressure cast zinc plated, non-handed lever trim that operates independently of non-locking levers.
   c. Style: Rhodes

5. Power Supply: 4 AA batteries
   a. Provide electronic access control locks and/or exit device trim with the ability to communicate battery status.

6. Features:
   a. Visual tri-colored LED indicators that indicate activation, operational systems status, system error conditions and low power conditions.
   b. Visual bi-colored LED indicator on interior that can indicate secured/unsecured status of device to occupants on interior.
   c. Audible feedback that can be enabled or disabled.
   d. Onboard processor with memory capacity of 2,000 event audit history, up to 16 time zones and up to 32 calendar events.
   e. Central verification time of less than 1 second
   f. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.

7. Access:
   a. Programmable Keypad
      1) 3-6-digit PIN code and 12 backlit buttons in a 3 x 4 matrix.

8. Operation:
   a. Provide electronic access control locks and/or exit device trim with the ability to be configured at door by handheld programming device the length of time device is unlocked upon access grant.
   b. Provide electronic access control locks and/or exit device trim with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device.

9. Programming Means:

2.10 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage/Von Duprin PS900 Series

2. Acceptable Manufacturers and Products:
   a. Precision ELR series
   b. Security Door Controls 600 series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.
   i. Tested and certified to meet UL294.
   j. NEMA 1 enclosure.
   k. Hinged cover w/lock down screws.
   l. High voltage protective cover.

2.11 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer:
   a. Falcon

2. Acceptable Manufacturers and Products:
   a. Best
   b. Corbin-Russwin

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
   a. Open: cylinder with small format interchangeable core (SFIC) core with open keyway

2.12 KEYING

A. Scheduled System:

1. New factory registered system:
   a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
   a. Replaceable Construction Cores.
      1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
         a) 3 construction control keys
         b) 12 construction change (day) keys.
      2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
   a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
      1) Master Keying system as directed by the Owner.
   b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
   c. Provide keys with the following features:
      1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
      2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
   d. Identification:
      1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
      2) Identification stamping provisions must be approved by the Architect and Owner.
      3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
      4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
      5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
   e. Quantity: Furnish in the following quantities.
      1) Permanent Control Keys: 3.
      2) Master Keys: 6.
      3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
      4) Key Blanks: Quantity as determined in the keying meeting.

2.13 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon SC70A series

2. Acceptable Manufacturers and Products:
   a. LCN 4050 series
   b. Norton 7500 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.

3. Closer Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon SC80A series

2. Acceptable Manufacturers and Products:
   a. LCN 1450 series
   b. Norton 8000 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
3. Closer Body: 1-1/4-inch (32 mm) diameter, with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 ELECTROMECHANICAL AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN Senior Swing 9500IQ Surface Mounted and 2800IQ Concealed Series

2. Acceptable Manufacturers and Products:
   a. Horton S4100LE
   b. Stanley Access Technologies M-Force

B. Requirements:

1. Electro-mechanical, handed low energy automatic operator, as defined by ANSI/BHMA standard A156.19.
   a. Automatic operator shall be capable of operating and controlling up to a 600-pound (272.15 kg) door, 48 inches (1219 mm) in wi
   b. Operator shall be activated via push button, push plate, switch-activated, manual or field-programmable manual/electric power with power assist and push and go opening capabilities compliant with ANSI A156.19.
   c. Calibration cycle: Operator will automatically configure a default for the user-adjustable features by determining the physical aspects of the door and opening area.
   d. Operator shall include individual connections for both fire / breakaway and blow open / hold open functionality, in addition to a short-term battery backup for proper functionality during power loss.

2. Surface-applied mounting: On surface of door frame/wall, mounted above top of door.
   a. Provide base mounting plate and mounting brackets allowing for simplified hook-and-cleat type of installation.
   b. Provide drop plates, brackets, cast arms, and adapters for arms as required to suit details.
   c. Tamper-resistant “Off/Auto/Hold-Open” switch to be provided on the device.
   d. Provide motion sensors and/or actuator switches, and receivers for operation as specified.
   e. Provide weather-resistant actuators at exterior applications.
   f. Provide key switches recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets. Cylinders: Refer to "KEYING" article, herein.
   g. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf.
   h. Actuators control both doors simultaneously [9550IQ] or independently [9560IQ] at pairs.
   i. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect.
   j. Locate actuators, key switches, and other controls as directed by Architect.

3. Overhead concealed mounting: Integrated into frame system, mounted 1/8” above top of door.
   a. Provide mounting header allowing for bottom loaded installation for easy access to controls.
   b. Provide forged steel arm and slide track for top of door
   c. Provide brackets and adapters for arms as required to suit details.
   d. Provide motion sensors and/or actuator switches, and receivers for operation as specified.
   e. Provide weather-resistant actuators at exterior applications.
   f. Provide key switches recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets. Cylinders: Refer to "KEYING" article, herein.
   g. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf.
   h. Actuators control both doors simultaneously [2850] or independently [2860] at pairs.
   i. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect.
   j. Locate actuators, key switches, and other controls as directed by Architect.
   k. Where operating a center pivoted inswinging door serving as a means of egress, provide breakaway switch to allow door to swing outward and automatically reset when returned to the closed position.

4. Finish of exposed headers: Anodized aluminum, dark bronze anodized, or anodized black – as specified in hardware sets.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco
   b. Burns

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco
   b. Burns

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco
   b. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.19 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Trimco
   b. Burns

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Scheduled Manufacturer:

1. Zero International

B. Acceptable Manufacturers:

1. National Guard
2. Pemko

C. Seals and Gasketing: Provide continuous gasketing on exterior openings, to the head and jambs, forming a continuous seal between the door and the frame. Provide smoke, light, or sound gasketing on interior doors where indicated.

1. Provide self-tapping fasteners for aluminum extruded gasketing being applied to hollow metal frames.
   a. Provide non-corrosive fasteners for all exterior applications.
   b. Provide security fasteners where indicated.

2. Provide neoprene, EPDM, silicone, or nylon brush inserts as specified in hardware sets. Provide non brush inserts of solid or sponge cell, as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

D. Smoke Labeled Gasketing: At all smoke labeled openings, provide smoke listed perimeter gasketing assemblies complying with NFPA 105 listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for smoke control ratings indicated based on testing according to UL 1784.

E. Fire Listed Gasketing: Assemblies complying with NFPA 80 that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction for fire ratings indicated based on testing according to UL-10C.

1. Where frame-applied intumescent seals are required by the manufacturer, provide gaskets that comply with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2, Fire Tests of Door Assemblies.

F. Sound-Rated Gasketing: Provide acoustic gasketing to meet Sound Transmission Class (STC) rating required.

G. Meeting-Stile Gasketing: Provide meeting-stile gasketing that fastens to the meeting stiles forming a continuous seal when doors are closed.

H. Door Sweeps or Shoes: Apply to the bottom of the door to close the gap between the door bottom and finished floor or saddle threshold.

1. Provide solid neoprene, EPDM, silicone, or nylon brush type of seal as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

I. Automatic Door Bottoms:

1. Provide closed cell sponge, bulb neoprene. or EPDM type of seal as specified in hardware sets.
2. Door bottom to be mortised, semi mortised, or surface mount as with a minimum thickness as specified in hardware sets.

J. Rain Drips:

1. Provide overhead rain drips for out-swinging hollow metal doors that are not covered against 45 degree blowing rain. Aluminum extrusion to be a minimum of .088 inches thick and extend 2.50 inches from the face of the frame, in anodized finish to match door.
2. Door sweeps or shoes with integral rain drip must meet ADA requirements

K. Thresholds: Provide threshold units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, and fabricated to accommodate door hardware and fit door frames.

1. Threshold extrusion to be a minimum thickness as specified in hardware sets.

2.21 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.

M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

P. Thresholds:

1. Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
2. Aluminum thresholds to be cut-in, and scribed around mullions, frame members, and stops. Do not butt to thresholds. Provide a continuous surface across full width of opening from jamb to jamb.
3. Where aluminum panic-type (rabbeted) thresholds with neoprene inserts are specified, undercut doors as required to properly mate with seal in threshold.

Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

R. Perimeter Gasketing:

1. Apply to head and jamb, forming seal between door and frame.
2. Install gasketing in a manner eliminating need to cut any seal to install surface mounted hardware. Install compatible mounting bracket for surface mounted hardware unless minimum 1/4 inch thick solid aluminum seals are provided for mounting of surface applied hardware.

S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Legend:
Link to catalog cut sheet
Electrified Opening

Hardware Group No. 00

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1		NO 087100 SCOPE		

Hardware Group No. 01

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	PIVOT SET	7226 SET		626	IVE
2	EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
2	EA	POWER TRANSFER	EPT10 CON		689	VON
1	EA	ELEC PANIC HARDWARE	MEL-24-C-C-718-CON 24 VDC		626	FAL
1	EA	ELEC PANIC HARDWARE	MEL-24-C-EO-CON 24 VDC		626	FAL
1	EA	MORTISE CYLINDER	C987 012667-013		626	FAL
1	EA	SFIC CORE	C607		626	FAL
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O		630-316	IVE
1	EA	SURFACE CLOSER	SC71A SS		689	FAL
1	EA	SURF. AUTO OPERATOR	9542IQ COV2 SW		ANCL R	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-810R		630	LCN
1	EA	WEATHER STRIPPING	WEATHERSTRIP BY DOOR/FRAME MFR			
2	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	655A-223		A	ZER
2	EA	WIRE HARNESS (FRAME)	CON-192P			SCH
2	EA	WIRE HARNESS (DOOR)	CON-LENGTH AS REQ			SCH
1	EA	POWER SUPPLY	PS902 900-2RS		LGR	SCE
			ACCESS CONTROL - WORK OF DIVISION 28			

DOORS NORMALLY CLOSED AND LOCKED.
DOORS UNLOCKED VIA CONTROL MODULE LOCATED AT OFFICE.
ACTIVE LEAF AUTOMATICALLY OPENE VIA INSIDE ACTUATOR OR CONTROL MODULE IN OFFICE.
DOORS WILL REMAIN LOCKED AND OPERATOR WILL DISABLE ON LOSS OF POWER.
FREE EGRESS AT ALL TIMES.

Hardware Group No. 02

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM LOCK	TM561H7 DAN	626	FAL
1	EA	SFIC CORE	C607	626	FAL
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	188SBK PSA	BK	ZER
1	EA	DOOR SWEEP	8197AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 03

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	T581H7 DAN		626	FAL
1	EA	SFIC CORE	C607		626	FAL
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR65		GRY	IVE

Hardware Group No. 04

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	BATH/BEDROOM PRIVACY LOCK	TM301 DAN		626	FAL
1	EA	MOP PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 05

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	CLASSROOM LOCK	TM561H7 DAN		626	FAL
1	EA	SFIC CORE	C607		626	FAL
1	EA	SURFACE CLOSER	SC81A HDPA		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP/HOLDER	WS45X		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 06

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	SGL CYL X TURN DB	D241H7		622	FAL
1	EA	SFIC CORE	C607		626	FAL
1	EA	PUSH PLATE	8200 6" X 16"		US26D	IVE
1	EA	PULL PLATE	8303 10" 6" X 16"		US26D-AM	IVE
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ FC		689	FAL
1	EA	MOP PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP/HOLDER	WS45X		626	IVE
3	EA	SILENCER	SR65		GRY	IVE

Hardware Group No. 07

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	SFIC CORE	C607		626	FAL
1	EA	SURFACE CLOSER	SC71A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	655A-223		A	ZER

STANDALONE BATTERY OPERATED ELECTRONIC LOCKSET NORMALLY CLOSED AND LOCKED, VALID PIN WILL MOMENTARILY UNLOCK. FREE EGRESS AT ALL TIMES.

END OF SECTION

SECTION 08 80 00 - GLAZING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glass coatings.

D. Glazing compounds.

1.2. RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers.

B. Section 07 26 00 - Vapor Retarders.

C. Section 07 27 00 - Air Barriers.

D. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

1.3. REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2026.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2026).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

F. ASTM C1036 - Standard Specification for Flat Glass; 2025.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.

J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.

K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

L. GANA (GM) - GANA Glazing Manual; 2022.

M. GANA (SM) - GANA Sealant Manual; 2008.

N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).

O. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.

P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2026.

R. NGA (LGRM) - Laminated Glazing Reference Manual; 2019.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit, Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 12 by 12 inch (___ by ___ mm) in size of glass units.

E. Samples: Submit 4 inch (____ mm) long bead of glazing sealant, color as selected.

F. Certificate: Certify that products of this section meet or exceed specified requirements.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6. QUALITY ASSURANCE

A. Perform work in accordance with GANA (GM), GANA (SM), IGMA TM-3000, and NGA (LGRM) for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.

C. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.7. FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Glass Fabricators:
1. Tecnoglass: www.tecnoglass.com/#sle.
2. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
3. Viracon, Inc: www.viracon.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Float Glass Manufacturers:
1. Guardian Glass, LLC: www.guardianglass.com/#sle.
2. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
3. Oldcastle Building Envelope.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Design Pressure: Calculated in accordance with ASCE 7.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
5. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
1. In conjunction with weather barrier related materials described in other sections, as follows:
   a. Water-Resistive Barriers: See Section 07 25 00.
   b. Vapor Retarders: See Section 07 26 00.
   c. Air Barriers: See Section 07 27 00.
2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.

3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Factor: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer progam.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3. GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.4. INSULATING GLASS UNITS

A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

C. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Warm-Edge Spacers: Low-conductivity thermoplastic with desiccant warm-edge technology design.
   a. Spacer Width: As required for specified insulating glass unit.
   b. Spacer Height: Manufacturer's standard.
   c. Products:
      1) H.B. Fuller Construction Products Inc; Kodispace 4SG: www.hbfuller.com/#sle.
      2) Quanex IG Systems, Inc; Super Spacer TriSeal: www.quanex.com/#sle.
      3) Substitutions: See Section 01 60 00 - Product Requirements.
4. Spacer Color: Black.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
   b. Color: Black.
6. Purge interpane space with dry air, hermetically sealed.
7. Pre-Equalized Insulated Glazing Units: Provide glazing units sealed at manufacturing plant with internal pressure matching pressure of the installation location.

D. Type IG-1 - Insulating Glass Units: Vision glass, double glazed; vacuum seal.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Vacuum seal space between lites.
4. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: OWNER SELECTED.
b. Coating: Self-cleaning type, on #1 surface.
c. Coating: Low-E (passive type), on #2 surface.
5. Warm-edge spacer.
6. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
7. Total Thickness: 1 inch (25.4 mm).
8. Thermal Transmittance (U-Factor): 0.60, nominal.
9. Visible Light Transmittance (VLT): 40-65 percent, nominal.
10. Solar Heat Gain Coefficient (SHGC): 0.25, nominal.
11. Glazing Method: Wet/dry glazing method, preformed tape and sealant.

E. Type IG-2 - Insulating Glass Units: Safety glazing.
1. Applications:
a. Glazed lites in exterior doors.
b. Glazed sidelights and panels next to doors.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Other locations indicated on drawings.
2. Space between lites filled with air.
3. Glass Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.
4. Tint: OWNER SELECTED.
5. Total Thickness: 1 inch (25.4 mm).
6. Warm-edge spacer.
7. Thermal Transmittance (U-Factor): 0.60, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.25, nominal.
9. Glazing Method: Wet/dry glazing method, preformed tape and sealant.

2.5. GLAZING UNITS

A. Type G-1 - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
a. Glazed lites in doors, except fire doors.
b. Glazed sidelights to doors, except in fire-rated walls and partitions.
c. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.
d. Other locations required by applicable federal, state, and local codes and regulations.
e. Other locations indicated on drawings.
2. Glass Type: Fully tempered safety glass as specified.
3. Tint: OWNER SELECTED.
4. Thickness: 1/4 inch (6.4 mm), nominal.
5. Glazing Method: Wet/dry glazing method, preformed tape and sealant.
6. Manufacturers:
a. Oldcastle Building Envelope; MONOLITHIC GLASS.
b. Guardian Glass, LLC.
c. Substitutions: See Section 01 60 00 - Product Requirements.

2.6. GLASS COATINGS

A. Solar Control Coating: Two-component, metal-oxide nano-particles with 5 percent solids content, minimum.
1. Application: Locations as indicated on drawings.
2. Color: Clear, fade resistant.
3. Dry Film Thickness: 10 microns (0.01 mm), bubble and crack resistant.
4. Visible Light Transmission: Maintains up to 80 percent.
5. Ultraviolet Light Reduction: 99.9 percent.
6. Shading Coefficient: 0.72.
7. Manufacturers:
a. Vitro Architectural Glass (formerly PPG Glass); SOLARBAN SERIES.
b. Guardian Glass, LLC; SUNGUARD SERIES.
c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Protective Glass Coatings: Transparent coatings used to seal and protect surface of glass subject to wear, soiling, and degradation from environmental exposure.
1. Application: Locations as indicated on drawings.
2. Hydrophobic Coatings: Organosilane-based; causes water to bead on coated surface at contact angle of 70 degrees, minimum.

2.7. GLAZING COMPOUNDS

A. Type GC-1 - Polyurethane Sealant: Single component, chemical curing, nonstaining, nonbleeding; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.

B. Type GC-2 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

C. Manufacturers:
1. Dow; DOWSIL 982 Silicone Insulating Glass Sealant Base and Catalyst: www.dow.com/#sle.
2. Momentive Performance Materials, Inc; SilPruf SCS2000: www.momentive.com/#sle.
3. Tremco Commercial Sealants & Waterproofing; Proglaze: www.tremcosealants.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.8. ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.

B. Spacer Shims: EPDM, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
1. Width: As required for application.
2. Thickness: As required for application.
3. Spacer Rod Diameter: As required for application.
4. Manufacturers:
a. Tremco Global Sealants; 440 TAPE: www.tremcosealants.com/#sle.

b. C.R. Laurence; BUTYL ARHITECTURAL GLAZING TAPE.
c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1. VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2. PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3. INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.4. INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length and set against permanent stops, 3/16 inch (5 mm) below sight line. Seal corners by butting tape and dabbing with butyl sealant.

C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

D. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.

E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch (6.4 mm) below sight lines.
   1. Place glazing tape on glazing pane of unit with tape flush with sight line.

G. Fill gap between glazing and stop with _____ type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch (9 mm) below sight line.

H. Apply cap bead of _____ type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

C. Monitor and report installation procedures and unacceptable conditions.

3.6. CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

C. Remove nonpermanent labels immediately after glazing installation is complete.

D. Clean glass and adjacent surfaces after sealants are fully cured.

E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.7. PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

3.8. SCHEDULES

A. Aluminum Window Glazing: Glass Type G-1, install glass using wet/dry method with Type GC- ___ glazing compound.

B. Aluminum-Framed Storefront Glazing: Glass Type IG-1 / IG-2, install glass using dry method, and with glass thickness as required to comply with performance requirements indicated in Section 08 43 13.

C. Aluminum Entrance Window Glazing: Glass Type IG-2, install glass using wet/dry method with Type GC- ___ glazing compound.

D. Steel Door Glazing:
   1. Interior: Glass Type G-1, 1/4 inch (6 mm) thick, install glass using wet method with Type GC- 1 glazing compound.
   2. Exterior: Glass Type IG-2, 1/4 inch (6 mm) thick, install glass using wet method with Type GC- 2 glazing compound.

END OF SECTION

SECTION 09 05 61 - COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. EPOXY FINISH.

B. Removal of existing floor coverings.

C. Preparation of existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture and alkalinity (pH).

E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

F. Patching compound.

G. Remedial floor coatings.

1.2. RELATED REQUIREMENTS

A. Section 01 22 00 - Unit Prices: Bid pricing for remediation treatments if required.

1.3. PRICE AND PAYMENT PROCEDURES

A. Unit Prices: See Section 01 22 00 - Unit Prices.

B. Unit Price for Remedial Floor Coating or Sheet Membrane: Do not include the cost of the floor coating or underlayment in the base bid; state on the bid form the unit price per square foot (square meter) for the floor coating or underlayment, installed, in the event such remediation is required.
   1. Base the unit price on a total quantity of 300 square feet (_____ square meters).

1.4. REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2026.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.

C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

D. ASTM F3010 - Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings;2018.

E. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2018.

1.5. ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.6. SUBMITTALS

A. Visual Observation Report: For existing floor coverings to be removed.

B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and alkalinity (pH) limits and test methods.
   2. Manufacturer's required bond/compatibility test procedure.

C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
   1. Manufacturer's qualification statement.
   2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
   3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
   4. Manufacturer's installation instructions.
   5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

D. Testing Agency's Report:
   1. Description of areas tested; include floor plans and photographs if helpful.
   2. Summary of conditions encountered.
   3. Moisture and alkalinity (pH) test reports.
   4. Copies of specified test methods.
   5. Recommendations for remediation of unsatisfactory surfaces.
   6. Product data for recommended remedial coating.
   7. Certificate: Include certification of accuracy by authorized official of testing agency.
   8. Submit report directly to Owner.
   9. Submit report not more than two business days after conclusion of testing.

E. Adhesive Bond and Compatibility Test Report.

F. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.

G. Copy of RFCI (RWP).

1.7. QUALITY ASSURANCE

A. Moisture and alkalinity (pH) testing will be performed by an independent testing agency employed and paid by Owner.

B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
   1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
   2. Acceptable Testing Agencies:

a. Independent Floor Testing & Inspection, Inc. (IFTI): www.ifti.com/#sle.
b. Other testing agency approved by Owner.

D. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
2. Confirm date of start of testing at least 10 days prior to actual start.
3. Allow at least 4 business days on site for testing agency activities.
4. Achieve and maintain specified ambient conditions.
5. Notify Owner when specified ambient conditions have been achieved and when testing will start.

E. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.

F. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.8. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

1.9. FIELD CONDITIONS

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1. MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
3. Products:
a. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
b. LATICRETE International, Inc: www.laticrete.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Remedial Floor Coating, Two-Component: Single-layer coating resistant to water vapor transmission meeting flooring manufacturer's emission limits, resistant to alkalinity (pH) level found, and suitable for flooring adhesion without further treatment.
1. Material: Comply with ASTM F3010.

2. Thickness: As required for application and in accordance with manufacturer's installation instructions.
3. Use product recommended by testing agency.

PART 3 EXECUTION

3.1. CONCRETE SLAB PREPARATION

A. Follow recommendations of testing agency.

B. Perform following operations in the order indicated:
1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
   a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
   b. Removal of existing floor covering.
2. Preliminary cleaning.
3. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
6. Specified remediation, if required.
7. Patching, smoothing, and leveling, as required.
8. Other preparation specified.
9. Adhesive bond and compatibility test.
10. Protection.

C. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2. REMOVAL OF EXISTING FLOOR COVERINGS

A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.

B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.3. PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.4. MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.

F. Report: Report the information required by the test method.

3.5. ALKALINITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.6. PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with recommendations of testing agency.

C. Comply with requirements and recommendations of floor covering manufacturer.

D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

E. Do not fill expansion joints, isolation joints, or other moving joints.

3.7. ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.8. APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

3.9. PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Cementitious backing board.

E. Gypsum wallboard.

F. Joint treatment and accessories.

G. Acoustic (sound-dampening) wall and ceiling board.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07 21 00 - Thermal Insulation: Acoustic insulation.

C. Section 09 30 00 - Tiling: Tile backing board.

1.3. REFERENCE STANDARDS

A. AISI S201 - North American Standard for Cold-Formed Steel Framing - Product Data; 2017.

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2020.

D. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.

E. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.

F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

G. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2025.

H. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

I. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).

J. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2026).

K. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

L. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2025.

M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

N. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.

O. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2025.

P. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.

Q. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

C. Sequencing: Install service utilities in an orderly and expeditious manner.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
1. Provide data on gypsum board, accessories, and joint finishing system.
2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

C. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches (300 by 300 mm) in size, indicating finish color and texture.

D. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, indicating finish color and texture.

E. Evaluation Service Reports: Show compliance of grid suspension systems with specified requirements.

F. Installer's Qualification Statement.

1.6. QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, and shop drawings.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1. GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions in accordance with ASCE 7 for Seismic Design Category D, E, or F and complying with the following:

C. Grid Suspension Systems: Provide grid suspension systems in accordance with ASTM C840 and GA-216 complying with the following:

2.2. METAL FRAMING MATERIALS

A. Material and Product Requirements: AISI S201 and AISI S220.

B. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.

C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
1. Studs: C-shaped with knurled or embossed faces.
2. Runners: U shaped, sized to match studs.

D. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
1. Products:
a. Armstrong World Industries, Inc; Acoustibuilt..
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com/#sle.
3. USG Corporation: www.usg.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Thickness:
a. Vertical Surfaces: 5/8 inch (16 mm).
b. Ceilings: 1/2 inch (13 mm).
3. Paper-Faced Products:

a. CertainTeed Corporation; REGULAR DRYWALL: www.certainteed.com/#sle.
b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond 5/8" Gypsum Board: www.goldbondbuilding.com/#sle.
c. USG Corporation; Sheetrock Brand EcoSmart Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

4. Mold-Resistant, Paper-Faced Products:
a. CertainTeed Corporation; M2Tech 5/8" Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond EVOLVE XP Gypsum Board: www.goldbondbuilding.com/#sle.
c. USG Corporation; Sheetrock Brand EcoSmart Panels Mold Tough 5/8 in. (15.9 mm): www.usg.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Backing Board For Wet Areas: _____
1. Application: Surfaces behind tile in wet areas _____.
2. Application: Horizontal surfaces behind tile in wet areas _____.
3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
a. Thickness: 5/8 inch (16 mm).
b. Products:
1) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
2) USG Corporation; Fiberock Brand Tile Backerboard 5/8 in. (15.9 mm): www.usg.com/#sle.
3) Substitutions: See Section 01 60 00 - Product Requirements.
4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
a. Regular Type: Thickness 5/8 inch (16 mm).
b. Products:
1) CertainTeed Corporation; 5/8" GlasRoc Tile Backer: www.certainteed.com/#sle.
2) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Tile Backer: www.goldbondbuilding.com/#sle.
3) USG Corporation; Durock Brand Glass-Mat Tile Backerboard 5/8 in. (15.9 mm): www.usg.com/#sle.

D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
2. Thickness: 1/2 inch (13 mm).
3. Edges: Tapered.
4. Products:
a. CertainTeed Corporation; Interior Ceiling Drywall: www.certainteed.com/#sle.
b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond High Strength LITE Gypsum Board: www.goldbondbuilding.com/#sle.
c. USG Corporation; Sheetrock Brand UltraLight Panels 1/2 in. (12.7 mm): www.usg.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.4. GYPSUM BOARD ACCESSORIES

A. Acoustic Insulation: See Section 07 21 00.

B. Beads, Joint Accessories, and Other Trim: ASTM C1047; rigid plastic, galvanized steel, or rolled zinc.

1. Corner Beads: Low profile, for 90 degree outside corners.
   a. Products:
      1) CertainTeed Corporation; No-Coat Drywall Corner: www.certainteed.com/#sle.
      2) ClarkDietrich; Strait-Flex Big-Stick: www.clarkdietrich.com/#sle.
      3) Flannery, Inc; Corner Beads: www.flannerytrim.com/#sle.
      4) _____.
      5) Substitutions: See Section 01 60 00 - Product Requirements.

C. Moisture Guard Trim: ASTM C1047, rigid plastic, 48 inch (1219.2 mm) length, applied to bottom edge of gypsum board throughout building.
   1. Height: 1/2 inch (13 mm).
   2. Depth: 5/8 inch (15.88 mm).
   3. Products:
      a. Waterguard USA; Waterguard: www.waterguard-usa.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

E. Nails for Attachment to Wood Members: ASTM C514.

F. Staples For Attachment of Base Ply of Two-Ply Assembly to Wood Members: Flattened galvanized wire type as specified in ASTM C840.

G. Adhesive for Attachment to Wood, ASTM C557:
   1. Products:
      a. Franklin International, Inc; Titebond Drywall Construction Adhesive: www.titebond.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2. FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.

C. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

D. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall-mounted cabinets.
   3. Plumbing fixtures.
   4. Toilet accessories.
   5. Wall-mounted door hardware.

3.3. BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

E. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
   1. Single-Layer Applications: Adhesive application.

3.4. INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated on drawings.
   1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Moisture Guard Trim: Install on bottom edge of gypsum board throughout building.

3.5. JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
   2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling, and sanding are not required at base layer of double-layer applications.

D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.6. TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

3.7. CLEANING

A. Clean _____.

3.8. PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 51 00 - ACOUSTICAL CEILINGS - ARMSTRONG

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Acoustical units.

B. Suspension systems.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

E. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

F. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

G. CHPS (HPPD) - High Performance Products Database; Current Edition.

H. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Install acoustical ceilings after building is enclosed, sufficient heat is provided, dust-generating activities are terminated, and overhead work is completed, tested, and approved. Install acoustical units after interior wet work is dry.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples:
   1. Submit two samples 6 by 6 inch (152.4 by 152.4 mm) in size illustrating material and finish of acoustical units.
   2. Submit two samples each, 12 inches (304.8 mm) long, of suspension system main runner, cross runner, and perimeter molding.

E. Evaluation Service Reports: Show compliance with specified requirements.

F. Manufacturer's Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Designer's qualification statement.

H. Manufacturer's qualification statement.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements for additional provisions.
2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.6. QUALITY ASSURANCE

A. Designer Qualifications: Perform seismic design under direct supervision of professional structural engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7. FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent before, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.

B. Substitutions: Not permitted.

2.2. PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84.

B. Seismic Performance: Ceiling systems designed to withstand effects of earthquake motions in accordance with ASCE 7 for Seismic Design Category D, E, or F and complying with the following:
1. Local authorities having jurisdiction.

2.3. ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264.
1. VOC Content: Certified as Low Emission by one of the following:
a. Product listing in UL (GGG).
b. Product listing in CHPS (HPPD).

B. Acoustical Panels: With the following characteristics:
1. Applications: MULTIPURPOSE (HIGH NRC); UNISEX (HUMIGUARD PLUS / BIOBLOCK); OTHERS (STANDARD).
2. Classification: ASTM E1264, Type A.
a. Form: A1.2, wet formed.
b. Pattern: D - fissured.

3. Size: 24 by 24 inches (610 by 610 mm).
4. Thickness: 5/8 inch (16 mm).
5. Light Reflectance: 0.85 percent, in accordance with ASTM E1264.
6. Noise Reduction Coefficient (NRC) Range: 0.55 to 0.75, in accordance with ASTM E1264.
7. Ceiling Attenuation Class (CAC): 0.35, in accordance with ASTM E1264.
8. Panel Edge: ANGLED TEGULAR.
9. Color: White.
10. Suspension System, PRELUDE XL 15/16": Exposed grid.
11. Products:
    a. Armstrong World Industries, Inc; Fine Fissured.

C. Acoustical Panels: With the following characteristics:
1. Applications: WARMING KITCHEN / KITCHEN.
2. Classification: ASTM E1264, Type A.
    a. Form: A3.2.
    b. Pattern: G - smooth.
3. Size: 24 by 24 inches (610 by 610 mm).
4. Thickness: 5/8 inch (16 mm).
5. Light Reflectance: 0.89 percent, in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): 33, in accordance with ASTM E1264.
7. Panel Edge: Square.
8. Color: White.
9. Suspension System, PRELUDE 15/16": Exposed grid.
10. Products:
    a. Armstrong World Industries, Inc; Kitchen Zone.

2.4. SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.
1. Materials:

B. Exposed Suspension System: Hot-dip galvanized steel grid with steel cap.
1. Applications: Seismic.
2. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
3. Profile: Tee; 15/16-inch (24 mm) face width.
4. Finish: Baked enamel.
5. Color: White.
6. Products:
    a. Armstrong World Industries, Inc; Prelude / Prelude XL.

C. Exposed Suspension System, Type _____: Hot-dip galvanized steel grid and cap.
1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
2. Profile: Tee; 15/16-inch (24 mm) face width.
3. Finish: Baked enamel.
4. Color: White.
5. Products: Armstrong World Industries, Inc; Prelude Plus XL Fire Guard.

2.5. ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.

C. Hold-Down Clips: Manufacturer's standard clips to suit application.

D. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.

E. Metal Edge Trim for Suspension Systems: Extruded aluminum; provide attachment clips, splice plates, and preformed corner pieces for complete trim system.
   1. Trim Height: 6 - 12 inches (_____ mm).
   2. Finish: Baked enamel.
   3. Color: White.
   4. Products: Armstrong World Industries, Inc; AXIOM Classic.

F. Touch-Up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers does not interfere with other work.

3.2. PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate location of hangers with other work.

3.3. INSTALLATION - SUSPENSION SYSTEMS

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to perimeter molding on two adjacent walls; on opposite walls, maintain 3/4-inch (19 mm) clearance between grid ends and wall.

D. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.

E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

F. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.

G. Do not eccentrically load system or induce rotation of runners.

3.4. INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

F. Install hold-down clips on panels within 20 feet (6 m) of exterior door.

3.5. TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6. REPAIR

A. Replace damaged or abraded components.

3.7. CLEANING

A. Clean surfaces.

END OF SECTION

SECTION 09 65 00 - RESILIENT FLOORING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Resilient base.

1.2. RELATED REQUIREMENTS

A. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.3. REFERENCE STANDARDS

A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Verification Samples: Submit two samples, ___ by ___ inch (___ by ___ mm) in size illustrating color and pattern for each resilient flooring product specified.

E. Manufacturer's Qualification Statement.

F. Installer's Qualification Statement.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Wall Base: 120 linear feet (_____ linear meters) of each type and color.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

PART 2 PRODUCTS

2.1. RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TV, vinyl, thermoplastic; style as scheduled.
1. Manufacturers:
a. Roppe Corporation; VINYL WALL BASE; CALLA LILY 695: www.roppe.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.
2. Height: 4 inches (100 mm).
3. Thickness: 0.125 inch (3.2 mm).
4. Finish: Satin.
5. Length: 4 foot (1.2 m) sections.
6. Color: As indicated on drawings.
7. Accessories: Premolded external corners and internal corners.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.2. PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

3.3. INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

3.4. INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.5. CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.6. PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 67 00 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Fluid-applied flooring and base.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available; and _____.

C. Samples: Submit two samples, 6 by 6 inch (____by____ mm) in size illustrating color and pattern for each floor material for each color specified.

D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.

F. Manufacturer's Qualification Statement.

G. Applicator's Qualification Statement.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5. QUALITY ASSURANCE

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

B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum 3 years of documented experience.
   2. Approved by manufacturer.

C. Supervisor Qualifications: Trained by product manufacturer , under direct full time supervision of manufacturer's own foreman.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.7. FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Fluid-Applied Flooring:
1. STONHARD: COMMERCIAL & INDUSTRIAL FLOORING.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring: Epoxy, two component, thermosetting, colored with decorative color flakes, with aggregate broadcast on base coat.
1. Aggregate: Large vinyl flakes, multiple colors as selected.
2. Top Coat: Epoxy, two component, thermosetting; ____ inch (____ mm) thick; clear.
3. Non-slip Surfacing: Color Flakes, color as selected.
4. Color: Selected by Architect.
5. Products:
a. STONHARD; STONTEC ERF (SHENANDOAH BLUFF; LARGE FLAKES).
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3. ACCESSORIES

A. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

3.2. PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Prepare concrete surfaces according to ICRI 310.2R, _____.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

D. Apply primer to surfaces required by flooring manufacturer.

3.3. INSTALLATION - ACCESSORIES

3.4. INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness required by manufacturer.

C. Finish to smooth level surface.

D. Cove at vertical surfaces.

3.5. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.6. PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Exposed surfaces of steel lintels and ledge angles.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Floors, unless specifically indicated.
   7. Ceramic and other types of tiles.
   8. Glass.
   9. Concealed pipes, ducts, and conduits.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020 (Reapproved 2025).

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

D. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, submit each color in each sheen available.
   3. Allow 30 days for approval process, after receipt of complete samples by Architect.
   4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.7. FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.

B. Paints:
1. Base Manufacturer: Sherwin Williams.
2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

2.2. PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Supply each paint material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Flammability: Comply with applicable code for surface burning characteristics.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.

2.3. PAINT SYSTEMS - EXTERIOR

A. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including primed wood and primed metal.
1. Two top coats and one coat primer.
2. Top Coat(s): Exterior Latex, High Performance Architectural; MPI #311 or 315.
3. Primer: As recommended by top coat manufacturer for specific substrate.

2.4. PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Alkali-Resistant Water-Based Primer; MPI #3.
2. Anti-Corrosive Alkyd Primer for Metal; MPI #79.
3. Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
4. Alkyd Primer for Galvanized Metal.
5. Water Based Primer for Galvanized Metal; MPI #134.
6. Latex Primer for Exterior Wood; MPI #6.

2.5. ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1. EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Exterior Plaster and Stucco: 12 percent.
   2. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2. PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Galvanized Surfaces:

G. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

H. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

3.3. APPLICATION

A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.5. CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6. PROTECTION

END OF SECTION

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Glass.
   9. Concealed pipes, ducts, and conduits.

1.2. REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020 (Reapproved 2025).

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

D. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.3. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).

3. Cross-reference to specified paint system products to be used in project; include description of each system.
4. Manufacturer's installation instructions.
5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
2. Where sheen is not specified, submit each color in each sheen available.
3. Allow 30 days for approval process, after receipt of complete samples by Architect.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gal (4 L) of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.4. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.6. FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 fc (860 lux) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. If a single manufacturer cannot provide specified products; minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
   2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.

B. Paints:
   1. Base Manufacturer: Sherwin Williams.
   2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

2.2. PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Flammability: Comply with applicable code for surface burning characteristics.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: As indicated on drawings.
   1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.3. PAINT SYSTEMS - INTERIOR

A. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, wood, uncoated steel, shop primed steel, and galvanized steel.
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 139 X-Green, 140, 141, or 142.

B. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
   1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
   2. Two top coats and one coat primer.
   3. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, 141, or 142.
   4. Top Coat Sheen:
      a. Eggshell: MPI gloss level 3; use this sheen ; see finish schedule.
      b. Satin: MPI gloss level 4; use this sheen ;see finish schedule.
   5. Primer: As recommended by top coat manufacturer for specific substrate.

C. Medium Duty Vertical and Overhead: Including gypsum board, plaster, concrete, concrete masonry units, uncoated steel, shop primed steel, galvanized steel, and aluminum.
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, 141, or 142.
   3. Top Coat Sheen:
      a. Eggshell: MPI gloss level 3; use this sheen ; see finish schedule.
      b. Satin: MPI gloss level 4; use this sheen ;see finish schedule.

2.4. PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
   1. Alkali Resistant Water Based Primer; MPI #3 or 3 X-Green.
   2. Interior Latex Primer Sealer; MPI #50 or 50 X-Green.
   3. Latex Primer for Interior Wood; MPI #39.

2.5. ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1. EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2. PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

F. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

G. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high-alkali surfaces.

H. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

I. Galvanized Surfaces:

J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

K. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

L. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

3.3. APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.5. CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6. PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. High performance coatings.

B. Surface preparation.

1.2. RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.

1.3. REFERENCE STANDARDS

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.

C. Samples: Submit two samples 8 by 8 inch (203 by 203 mm) in size illustrating colors available for selection.

D. Manufacturer's Certificate: Certify that high-performance coatings comply with VOC limits specified.

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

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Maintenance Data: Include cleaning procedures and repair and patching techniques.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.5. QUALITY ASSURANCE

A. Maintain one copy of each referenced document that applies to application on site.

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

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum _____ years documented experience.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.7. FIELD CONDITIONS

A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

B. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).

C. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

D. Restrict traffic from area where coating is being applied or is curing.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Only materials (primers, coatings, etc.) listed in the latest edition of the MPI (APL) are acceptable for use on this project.

B. Provide high performance coating products from the same manufacturer to the greatest extent possible.

C. High-Performance Coatings:
1. Sherwin-Williams Company: industrial.sherwin-williams.com//#sle.
2. Stonhard: www.stonhard.com/#sle.

2.2. HIGH-PERFORMANCE COATINGS

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in MPI Approved Products List.

B. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:

2.3. TOP COAT MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the specified applications and thicknesses; number of coats specified does not include primer or filler coat.

B. High-Build Epoxy Coating for UNISEX / WARMING KITCHEN / KITCHEN:
1. Number of Coats: Two.
2. Product Characteristics:
   a. Percentage of solids by volume, 70, minimum.
   b. Dry film thickness, per coat, 3.7, minimum.
   c. Comply with the performance requirements specified above for moderate exposure.
3. Top Coat(s): Epoxy, High-Build; MPI #98, #108, #120.
   a. Sheen: Gloss.
   b. Products:
      1) Sherwin-Williams; Pro Industrial High Performance Epoxy. (MPI #98)
4. Primer: As recommended by coating manufacturer for specific substrate.

C. Shellac: Pure, white type.

2.4. PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
1. Primer Sealer, Latex, Interior; MPI #50.
   a. Products:
      1) Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Primer. (MPI #50)
      2) Substitutions: Section 01 60 00 - Product Requirements.

2.5. ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum and measured moisture content is not greater than 12 percent.
2. Plaster and Stucco: 12 percent.
3. Wood: Do not begin application if substrate has moisture content over 12 percent.

H. Proceed with coating application only after unacceptable conditions have been corrected.
1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.2. PREPARATION

A. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

B. Clean surfaces of loose foreign matter.

C. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

D. Remove finish hardware, fixture covers, and accessories and store.

3.3. PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

B. Wood: Prior to priming patch with filler to produce smooth, even surface.

C. Wood Items to Receive High-Performance Coating: Wipe off dust and grit, sealing, seal knots, pitch streaks, and sappy sections as directed by coating manufacturer. Fill nail holes and cracks with matching tinted filler.

3.4. COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.5. FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection.

B. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
1. Touch up and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, and specified thickness, Contractor shall pay for retesting and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations, and specified thickness.

3.6. CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.7. PROTECTION

A. Protect finished work from damage.

END OF SECTION

SECTION 10 14 23 - PANEL SIGNAGE

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Panel signage.

1.2. REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
   2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
      a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
      b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
      c. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.

E. Verification Samples: Submit samples showing colors, materials, and finishes specified.

F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

G. Manufacturer's qualification statement.

1.4. QUALITY ASSURANCE

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

1.5. DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store under cover and elevated above grade.

D. Store tape adhesive at normal room temperature.

1.6. FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Panel Signage:
1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
2. Inpro Corporation: www.inprocorp.com/#sle.
3. Vista System LLC: www.vistasystem.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.3. PANEL SIGNAGE

A. Panel Signage for UNISEX RESTROOMS:
1. Application: Room and door signs.
2. Description: Flat signs with engraved panel media, tactile characters.
3. Sign Size: As indicated on drawings.
4. Total Thickness: 1/8 inch (3 mm).
5. Corners: Radiused.
6. Color and Font, unless otherwise indicated:
   a. Character Font: Helvetica, Arial, or other sans serif font.
   b. Character Case: Upper and lower case (title case).
   c. Background Color: As scheduled.
   d. Character Color: Contrasting color.
7. Material: Laminated colored plastic engraved through face to expose core as background color.
8. Profile: Flat panel in aluminum frame.
   a. Frame Finish: Black anodized.
9. Tactile Letters: Raised 1/32 inch minimum.

2.4. SIGNAGE APPLICATIONS

A. Room and Door Signs:
1. Rest Rooms: Identify with pictograms with label "UNISEX", and braille.

2.5. ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2. INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until mm-dd-yyyy; repair or replace damaged items.

END OF SECTION

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Corner guards.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2026.

B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.

E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.

C. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.

D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
   1. Submit two sections of corner guards, 24 inches (610 mm) long.

E. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and _____.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

B. Protect work from moisture damage.

C. Protect work from UV light damage.

D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.

E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.6. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for metal crash rails. Complete forms in Owner's name and register with manufacturer.
   1. Failures include, but are not limited to, the following:
      a. Structural failures or internal connection failures.
      b. Deterioration of materials beyond that expected of normal use, as intended by manufacturer.

C. Installer Warranty: Provide 5-year warranty for metal crash rails commencing on Date of Substantial Completion. Complete forms in Owner's name and register with installer.
   1. Failures include, but are not limited to, the following:
      a. Detachment of rail system from substrate.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Corner Guards:
   1. Construction Specialties, Inc; ACROVYN SSM SERIES: www.c-sgroup.com/#sle.
   2. Inpro Corporation; Corner Guards - Surface Mounted: www.inprocorp.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. PERFORMANCE CRITERIA

A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.3. PRODUCT TYPES

A. Corner Guards - Surface Mounted:
   1. Material: Polyethylene terephthalate (PET or PETG); PVC-free with full height extruded aluminum retainer.
   2. Thickness: 0.075 inch (1.9 mm).
   3. Performance: Resist lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
   4. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   5. Width of Wings: 2 inches (51 mm).

6. Corner: Radiused.
7. Color: As selected from manufacturer's standard colors.
8. Length: One piece, 48 inches (1219 mm).
9. Mounting: Countersunk screws through factory-drilled holes.
10. Preformed end caps.

2.4. FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

2.5. SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that substrate surfaces for adhered items are clean and smooth.

C. Start of installation constitutes acceptance of project conditions.

3.2. INSTALLATION

A. Position corner guard 4 inches (102 mm) above finished floor to _____.

3.3. TOLERANCES

A. Maximum Variation From Required Height: 1/4 inch (6 mm).

B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch (6 mm).

3.4. CLEANING

A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Commercial toilet accessories.

B. Commercial shower and bath accessories.

C. Under-lavatory pipe supply covers.

1.2. RELATED REQUIREMENTS

A. Section 22 40 00 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

1.3. ABBREVIATIONS AND ACRONYMS

A. PETG: Polyethylene Terephthalate Glycol.

B. PPE: Personal Protective Equipment.

1.4. REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

B. ASTM C1036 - Standard Specification for Flat Glass; 2025.

C. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.

1.5. ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.6. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:

1. BOBRICK WASHROOM EQUIPMENT, INC..
2. Substitutions: Section 01 60 00 - Product Requirements.

B. Provide products of each category type by single manufacturer.

2.2. MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304 / 430.

D. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

E. Adhesive: Two component epoxy type, waterproof.

F. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.3. FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

2.4. COMMERCIAL TOILET ACCESSORIES

A. Toilet Paper Dispenser: Double roll, surface mounted, for cored or coreless type rolls.
1. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-2892 SURFACE-MOUNTED TWIN JUMBO-ROLL TOILET TISSUE DISPENSER.
b. Substitutions: Section 01 60 00 - Product Requirements.

B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
1. Capacity: 500 multifold minimum.
2. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-9262 FINO COLLECTION SURFACE-MOUNTED PAPER TOWEL DISPENSER.
b. Substitutions: Section 01 60 00 - Product Requirements.

C. Waste Receptacle: Recessed, stainless steel, seamless lower door for access to container, with tumbler lock, reinforced panel full height of door, push-in self-closing top door, continuously welded bottom pan and seamless exposed flanges.
1. Liner: Removable, heavy-duty vinyl liner, attached at a minimum of four points with stainless steel grommets and hooks.
2. Minimum capacity: 4 gallons (15 liters).
3. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-43644 CONTURASERIES RECESSED WASTE RECEPTACLE WITH LINERMATE.
b. Substitutions: Section 01 60 00 - Product Requirements.

D. Automated Soap Dispenser: FOAM SOAP dispenser, wall-mounted, with stainless steel cover and window to gauge soap level, tumbler lock.
1. Minimum Capacity: 27 ounces (0.8 liters).
2. Products:

a. BOBRICK WASHROOM EQUIPMENT, INC.; B-2013 AUTOMATIC WALL-MOUNTED FOAM SOAP DISPENSER.
b. Substitutions: Section 01 60 00 - Product Requirements.

E. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.
1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
2. Size: 1836.
3. Frame: 0.05 inch (1.3 mm)angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
4. Backing: Full-mirror sized, minimum 0.03 inch (0.8 mm) galvanized steel sheet and nonabsorptive filler material.
5. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-165 SERIES.
b. Substitutions: Section 01 60 00 - Product Requirements.

F. Grab Bars: Stainless steel, smooth surface.
1. Standard Duty Grab Bars:
a. Push and Pull Point Load: Minimum 250 lbf (1112 N).
b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 18-gauge, 0.05-inch (1.02 mm) steel thickness, concealed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
c. Finish: Satin.
d. Length and Configuration: As indicated on drawings.
e. Products:
1) BOBRICK WASHROOM EQUIPMENT, INC.; B-6806 SERIES.
2) Substitutions: Section 01 60 00 - Product Requirements.

G. Sanitary Napkin Disposal Unit: Stainless steel, recessed, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
1. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-3513 TRIMLINESERIES RECESSED SANITARY NAPKIN DISPOSAL.
b. Substitutions: Section 01 60 00 - Product Requirements.

2.5. COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Robe Hook: Heavy-duty stainless steel, single-prong, SOLID ROD bracket and backplate for concealed attachment, satin finish.
1. Products:
a. BOBRICK WASHROOM EQUIPMENT, INC.; B-542 COAT HOOK.
b. Substitutions: Section 01 60 00 - Product Requirements.

2.6. UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Specified in 22 40 00 - Plumbing Fixtures.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as instructed by the manufacturer.

3.2. PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3. INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.4. PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking.

B. Section 09 91 23 - Interior Painting.

1.3. REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2026.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide extinguisher operational features.

C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

D. Certificate: Certify products of this section meet or exceed specified requirements.

E. Manufacturer's Instructions: Indicate special criteria and wall opening coordination requirements.

F. Maintenance contract.

G. Operation and Maintenance Data: Include test, refill, or recharge schedules and recertification requirements.

1.5. FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature causes freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Fire Extinguishers:
   1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: www.activarcpg.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:

1. Activar Construction Products Group, Inc. - JL Industries; Ambassador Series: www.activarcpg.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. FIRE EXTINGUISHERS

A. General Requirements: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Multipurpose Dry-Chemical-Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
1. Class: A:B:C.
2. Size: 5 lb (2.27 kg).
3. Temperature Range: Minus 65 to 120 degrees F (Minus 54 to 49 degrees C).

2.3. FIRE EXTINGUISHER CABINETS

A. Cabinet Construction: Non-fire rated.
1. Formed primed steel sheet; 20-gauge, 0.036-inch (0.9 mm) thick base metal.

B. Cabinet Configuration: Recessed type.
1. Size to accommodate accessories.
2. Trim: Flat rolled edge, with 2-1/2 - 3-inch (_____ mm) wide face.

C. Door: 20-gauge, 0.036-inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180-degree opening with two butt hinges.

D. Door Glazing: Float glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.

E. Cabinet Mounting Hardware: Appropriate to cabinet, with predrilled holes for placement of anchors.

F. Fabrication: Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: Primed for field paint finish.
1. See Section 09 91 23 for field painting.

H. Finish of Cabinet Interior: White colored enamel.

2.4. ACCESSORIES

A. Lettering: FIRE EXTINGUISHER text on decal or self-adhesive vinyl, prespaced black lettering in accordance with authorities having jurisdiction.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify substrate and site conditions for product installation are in accordance with manufacturer's written instructions.

C. Verify rough openings for cabinet are sized and located in accordance with manufacturer's written instructions.

D. Notify Architect in writing of conditions detrimental to completion of work. Do not proceed with installation until detrimental conditions are corrected.

3.2. INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 48 inches (1220 mm) from finished floor to TOP OF FIRE EXTINGUISHER CABINET.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

E. Position cabinet signage at left of cabinet.

3.3. MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Provide separate maintenance contract for specified maintenance service.

END OF SECTION

SECTION 10 56 13 - METAL STORAGE SHELVING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Four post shelving.

B. Cantilevered shelving.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Blocking and reinforcement in walls for anchoring shelving units.

1.3. REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Rated uniform shelf loads.
   2. Details of shelving assemblies, including reinforcement.
   3. Accessories.
   4. Storage and handling requirements and recommendations.
   5. Installation methods.
   6. Maintenance methods.

C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.

D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
   1. Indicate methods of achieving specified anchoring requirements.

E. Designer's qualification statement.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Executed warranty.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Shelves: Two of each size with shelf brackets.

1.5. QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum ____ years of documented experience and approved by manufacturer.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Inspect for dents, scratches, or other damage. Replace damaged units.

B. Store in manufacturer's unopened packaging until ready for installation.

C. Store under cover and elevated above grade.

1.7. WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer Warranty: Provide 1-year manufacturer warranty for rust, corrosion, and manufacturing defects. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Four Post Shelving:
1. QUANTUM; 1848C WIRE SHELVING SERIES.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Cantilevered Shelving:
1. QUANTUM; WC54-CB18 SERIES.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. SHELVING - GENERAL

A. See drawings for layout and sizes.

B. Seismic Design: Design for Seismic Zone 3, in accordance with ASCE 7, Section 9.

C. Anchors: Provide anchoring hardware to secure each shelving unit to floor and wall.
1. Provide hardware of type recommended by manufacturer for substrate.

2.3. FOUR POST SHELVING

A. Four Post, Thin Shelving: Steel post-and-shelf type with sway bracing, shelving brackets, shelving surfaces, and accessories as specified.
1. Unit Width: 48 inches (1219 mm), center to center of posts.
2. Shelf Capacity: Uniform distributed load of 50 psf (2.4 kPa), minimum.
3. Shelf Depth: 17-1/2 inches (445 mm), minimum.
4. Finish: CHROME.

5. Number of Units: As indicated on drawings.

2.4. CANTILEVERED SHELVING

A. Cantilevered Shelving: Freestanding formed steel post frame with slots for cantilevered shelving brackets, sufficiently rigid not to require sway bracing, shelving brackets, shelving surfaces, and accessories as specified.
1. Unit Width: 12 - 48 inches (__ mm), center to center of posts.
2. Shelf Capacity: Uniform distributed load of 50 psf (2.4 kPa), minimum.
3. Adjustability of Shelving: At intervals of 1 inches (25 mm) on center, minimum.
4. Shelf Depth: 17.5 inches (915 mm), minimum.
5. Finish: CHROME.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that substrate is level and that clearances are as specified.

B. Verify that walls are suitable for shelving attachment.

C. Do not begin installation until substrates have been properly prepared.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2. PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3. INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.

C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.

D. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch (3 mm) difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.4. CLEANING

A. Clean shelving and surrounding area after installation.

3.5. PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 10 56 17 - WALL MOUNTED STANDARDS AND SHELVING

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Steel shelf standards, brackets, and accessories.

B. See drawings for locations and configurations.

1.2. RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking in walls for attachment of standards.

1.3. REFERENCE STANDARDS

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Steel Shelf Standards and Brackets:
   1. QUANTUM; WC54-CB1260GY.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. COMPONENTS

A. Steel Shelf Standards, Brackets, and Accessories:
   1. Super-Duty Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch (25 mm) increments along entire length of standard, drilled and countersunk for screws.
      a. Load Capacity: Recommended by manufacturer for loading of 540 to 1,060 pounds (245 to 480 kg) per pair of standards.
      b. Finish: Electroplated, chrome-look.
      c. Brackets: 12 gauge, 0.1046 inch (2.66 mm) sheet steel, reinforced, locking into slots with molded nylon cam lock lever; size to suit shelves; same finish as standards.
      d. Bracket Quantity: Provide one bracket for each 12 inches (305 mm) of standard length.

B. Fasteners: Screws as recommended by manufacturer for intended application or as otherwise required by project conditions. Finish of exposed to view fasteners to match finish of standards and other components.

END OF SECTION

SECTION 10 73 16.13 - METAL CANOPIES

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Attached metal canopies.

1.2. RELATED REQUIREMENTS

A. Section 09 96 00 - High-Performance Coatings: Finish coating.

1.3. REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022, with Errata (2025).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

G. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2025.

H. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

K. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

L. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.

M. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

N. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2024.

O. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2025a.

P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

R. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.

C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.

D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

E. Designer's Qualification Statement.

F. Manufacturer's Qualification Statement.

G. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5. QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
   1. Comply with applicable code for submission of design calculations as required for acquiring permits.
   2. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform steel work in accordance with AISC 303.
   1. Maintain one copy on site.

C. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Not less than three years of documented experience.

D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.6. DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials to project site ready for erection.

C. Package using methods that prevent damage during shipping and storage on site.

D. Store materials under cover and elevated above grade.

1.7. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.

C. Finish Warranty: Provide manufacturer's one year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Metal Canopies:
1. CityScapes Inc: www.cityscapesinc.com/#sle.
2. Mapes Industries; Super Lumideck: https://mapes.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. METAL CANOPIES

A. Shop Fabricated Aluminum Canopy

B. Configuration: Layout and dimensions, column layout, canopy clearance, fascia profile, and roof covering design as indicated on drawings.
1. Installation: Cantilever-mounted to building structure with tension members.
2. Structural Framing System: Aluminum.
3. Covering Material: Aluminum.
4. Drainage Concept: Water collected in decking conducted into perimeter drain beams and discharged through _____.

C. Performance Requirements:
1. Design and fabricate metal canopy system to resist wind, snow, live, and seismic loads without failure, damage, or permanent deflection in accordance with ASCE 7:
a. Loads: In compliance with local building codes.
2. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F (49 degrees C) and surface temperature range of 180 degrees F (82 degrees C) without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.

2.3. COMPONENTS

A. Structural Steel Framing:
1. Columns: ASTM A500/A500M, Grade B, round or rectangular tubing, sized to suit project design load requirements.
2. Base and Top Plates: ASTM A36/A36M, with pre-drilled bolt holes.
3. Beams: Wide flange, ASTM A572/A572M Grade 50.
4. Other Structural Steel Members: ASTM A36/A36M.

B. Structural Aluminum Framing: Alloy and temper 6063-T5, 6063-T6, or 6061-T6.
1. Extruded Shapes and Tubes: ASTM B221 (ASTM B221M).
2. Rolled or Extruded Structural Shapes: ASTM B308/B308M.

3. Extruded Structural Pipe and Tube: ASTM B429/B429M.
4. Sheet and Plate: Alloy 5052, 5005, or 6061-T651, ASTM B209/B209M.

C. Covering:
1. Aluminum Decking:
a. Interlocking extruded aluminum decking modules.
1) Extruded Decking: ASTM B221 (ASTM B221M), Alloy and temper 6005-T5, 6061-T6, or 6063-T6.
b. Decking Orientation: Perpendicular to sidewalk.
2. Overhang: As indicated on drawings.

D. Fascia: Manufacturer's standard perforated profile.
1. Material: Aluminum Composite Material (ACM) panel.

E. Anchor Bolts: ASTM A307 or ASTM A572/A572M, formed with bent shank, assembled with template for casting into concrete.
1. Minimum exposed thread of 7 inches (178 mm) above footing and 23 inch (584 mm) minimum embedment.
2. Provide nuts and washers as required for column leveling and plumbing.

2.4. SHOP FABRICATION

A. Provide a complete system ready for erection at project site.

B. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

C. Weld steel members in accordance with AWS D1.1/D1.1M.

D. Weld aluminum members in accordance with AWS D1.2/D1.2M.

E. Fabricate connections for bolt, nut, and washer connectors.

2.5. FINISHES

A. Structural Steel Framing:
1. Shop Primer: Rust-inhibitive red oxide.

B. Aluminum Framing and Decking:
1. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31, clear anodic coating not less than 0.4 mils (0.01 mm) thick.

C. Steel Decking and Roofing: Polyester baked enamel finish; color as selected from manufacturer's standard range.

D. Fascia: Polyester baked enamel finish; color as selected from manufacturer's standard range.

2.6. ACCESSORIES

A. Structural Bolts: ASTM F3125/F3125M, Grade A325, minimum 3/4 inch (19 mm) diameter.

B. Trim, Closure Pieces, and Flashings: Same material, thickness and finish as sheet metal decking; factory-fabricated to required profiles.
1. Exposed Fasteners: Not permitted.

C. Grout: ASTM C1107/C1107M; non-shrinking; premixed compound consisting of non-metallic aggregate, cement, water-reducing and plasticizing agents.

D. Fasteners, Non-Structural: ASTM F593 stainless steel or ASTM A307 carbon steel.

PART 3 EXECUTION

3.1. EXAMINATION

A. Examine substrates and site area for conditions that might prevent satisfactory installation.

B. Verify that foundation, electrical utilities, and placed anchors are in correct position.

C. Verify that bearing surfaces are ready to receive this work.

D. Do not proceed with installation until all conditions are satisfactory.

3.2. INSTALLATION - FRAMING

A. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation.

B. Set column base plates with non-shrink grout to achieve full plate bearing.

C. Fasten columns to anchor bolts.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3. INSTALLATION - CANOPY COVERING

A. Install in accordance with manufacturer's instructions.

B. Fasten metal decking to metal support members, aligned level and plumb.

C. Install fascia panels, trim, and flashing.

D. Separate dissimilar metals using concealed bituminous paint.

E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.4. TOLERANCES

A. Maximum Variation from Level: Plus/Minus 1/8 inch (3.175 mm).

3.5. CLEANING

A. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.6. PROTECTION

A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION

SECTION 11 40 00 - FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Foodservice equipment.

B. Connections to utilities.

1.2. RELATED REQUIREMENTS

1.3. REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; Current Edition.

B. ITS (DIR) - Directory of Listed Products; Current Edition.

C. UL (DIR) - Online Certifications Directory; Current Edition.

1.4. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility service connection locations, service characteristics, and wiring diagrams.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and _____.

D. Certificates: Certify that products of this section meet or exceed specified requirements.

E. Operation Data: Provide operating data for the specified equipment.

F. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of standard products of the type specified.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of installation.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work of this section within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty for replacement or repair of scheduled equipment, refrigerant and compressors, including disconnection and removal of defective unit, and connection of replacement unit.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Foodservice Equipment:
1. REGENCY; 20" X 30" STAINLESS STEEL MICROWAVE SHELF (600MS2030)
2. LIST PROVIDED BY FOOD SERVICE CONSULTANT.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. REGULATORY REQUIREMENTS

A. Comply with applicable codes for utility requirements.

B. Products Requiring Electrical Connection: Listed and classified by FM (AG), ITS (DIR), UL (DIR), or testing agency acceptable to local authorities having jurisdiction as suitable for the purpose specified and indicated.

2.3. EQUIPMENT

A. Equipment Schedule: Refer to respective drawings and schedule PROVIDED BY FOOD SERVICE CONSULTANT IN CONJUNCTION WITH ARCHITECTURAL.

B. Installation Accessories: Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories as required for complete installation.

2.4. FABRICATION

A. Accommodate site installation of other services or equipment.

PART 3 EXECUTION

3.1. EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.2. INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

C. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.

3.3. EXISTING EQUIPMENT

A. Obtain, move, store, and re-install equipment, ready for utility connection.

B. Do work in cooperation with Owner so that normal function of services is minimally interrupted.

C. Clean existing equipment to be re-used _____.

D. Re-used Equipment: Refer to schedule on drawings for re-used equipment.

3.4. ADJUSTING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove and replace equipment creating excessive noise or vibration.

3.5. CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.6. PROTECTION

A. Remove protective coverings from prefinished work.

B. Protect finished work from damage.

3.7. FOODSERVICE EQUIPMENT SCHEDULE

A. SHEET QF-6 OF SET FROM FOOD SERVICE CONSULTANT:

END OF SECTION

SECTION 12 32 00 - MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Manufactured standard casework, with cabinet hardware.

1.2. RELATED REQUIREMENTS

A. Section 12 36 00 - Countertops: Additional requirements for countertops.

1.3. DEFINITIONS

A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.

B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.

C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.

1.4. REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. BHMA A156.9 - Cabinet Hardware; 2020.

1.5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.

C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.

D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 6 inches by 6 inches (152 mm by 152 mm).
   1. Plastic laminate samples, for color, texture, and finish selection.

E. Manufacturer's Installation Instructions.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

H. Maintenance Data: Manufacturer's recommendations for care and cleaning.

I. Finish touch-up kit for each type and color of materials provided.

1.6. QUALITY ASSURANCE

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

B. Quality Certification: Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section.
1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
2. This AWI (QCP) project is registered as project number _____.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
6. Replace, repair, or rework all work for which certification is refused.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

B. Acceptance at Site:
1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.

C. Storage:
1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.8. WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
1. Ruptured, cracked, or stained finish coating.
2. Discoloration or lack of finish integrity.
3. Cracking or peeling of finish.
4. Delamination of components.
5. Failure of adhesives.
6. Failure of hardware.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Plastic Laminate Casework:
   1. WILSONART; CHERRY PB SIENNA (8275K-05) TIMBERGRAIN FINISH.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2. CASEWORK, GENERAL

A. Quality Standard: AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Faced Cabinets: Custom Grade.

2.3. FABRICATION

A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.

B. Construction: As required for selected grade.

C. Structural Performance: Safely support the following minimum loads:
   1. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
   2. Drawers: 125 pounds (57 kg), minimum.
   3. Hanging Wall Cases: 300 pounds (135 kg).
   4. Shelves: 100 pounds (45 kg), minimum.

D. Seismic Performance: Casework, including attachments to other work, able to withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor: 1.0.

E. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.

F. Fixed panels at backs of open spaces between base cabinets.

G. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

H. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.

I. Countertop Panel-Type Supports: Materials similar to adjacent casework, 1-1/2 inch (38 mm) in width, with front-to-back and toe space dimensions matching base cabinet. Designed to be secured in a concealed fashion to countertop material. Include two leveling devices per support panel.

2.4. PLASTIC-LAMINATE-CLAD CASEWORK

A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
   1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
   2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
      a. Base Cabinets: 22 inches (559 mm).
      b. Tall Cabinets: 22 inches (559 mm).
      c. Wall Cabinets: 16 inches (406 mm).

3. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
   a. Finish: Matte or suede, gloss rating of 5 to 20.
   b. Surface Color and Pattern: As indicated on drawings.

2.5. COUNTERTOPS

A. Countertops: See Section 12 36 00.

2.6. CABINET HARDWARE

A. Manufacturer's standard types, styles and finishes.

B. Comply with BHMA A156.9 requirements.
   1. Acceptable base materials for plated finishes include brass, bronze, and steel.

2.7. ACCESSORIES

A. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

B. Sealant for Use in Casework Installation:
   1. Manufacturer's recommended type.

PART 3 EXECUTION

3.1. PREPARATION

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.2. EXAMINATION

A. Site Verification of Environmental Conditions:
   1. Do not deliver casework until the following conditions have been met:
      a. Building has been enclosed (windows and doors sealed and weather-tight).
      b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
      c. Ceiling, overhead ductwork, piping, and lighting have been installed.
      d. Installation areas do not require further “wet work” construction.

B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:

D. Verify adequacy of support framing and anchors.

E. Verify that service connections are correctly located and of proper characteristics.

3.3. INSTALLATION

A. Perform installation in accordance with manufacturer's instructions.

B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.

C. Set casework items plumb and square, securely anchored to building structure.

D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).

F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.

G. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches (407 mm) on center.

H. Install hardware uniformly and precisely.

I. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.

J. Replace units that are damaged, including those that have damaged finishes.

3.4. ADJUSTING

A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.5. CLEANING

A. Clean casework and other installed surfaces thoroughly.

3.6. PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.

C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 12 36 00 - COUNTERTOPS

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Countertops for manufactured casework.

1.2. RELATED REQUIREMENTS

A. Section 12 31 00 - Manufactured Metal Casework.

B. Section 12 32 00 - Manufactured Wood Casework .

1.3. REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

G. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

H. Installer's qualification statement.

I. Installation Instructions: Manufacturer's installation instructions and recommendations.

J. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5. QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

B. Quality Certification:
1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7. FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1. COUNTERTOPS

A. Quality Standard: See Section 12 31 00.

B. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
   a. Manufacturers:
      1) Wilsonart; TITANIUM GREY (9222SS): www.wilsonart.com/#sle.
      2) Substitutions: See Section 01 60 00 - Product Requirements.
   b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
   c. Color and Pattern: As selected by Architect from manufacturer's full line.
3. Other Components Thickness: 1/2 inch (12 mm), minimum.
4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge; use marine edge at sinks.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
6. Fabricate in accordance with manufacturer's standard requirements.

2.2. MATERIALS

A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

B. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3. FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
      a. Rout a 1/8 inch (3 mm) drip groove at underside of exposed overlapping edges, set back 1/2 inch (13 mm) from face of edge.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
   1. Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions.

PART 3 EXECUTION

3.1. EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2. PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3. INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Apply sealer products in accordance with manufacturer's written instructions.

C. Seal joint between back/end splashes and vertical surfaces.

3.4. TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.5. CLEANING

A. Clean countertops surfaces thoroughly.

3.6. PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 220000 - PLUMBING

PART 1 - GENERAL

1.1 SPECIAL NOTE

A. The "General Conditions" and "Supplementary General Conditions" are part of the specifications. Work under this section of the specifications shall be governed by requirements thereunder. The use of the word "PROVIDE" in the specifications and on drawings shall mean: Furnish and install complete supplying all necessary labor and materials.

B. Refer to Section 230200 for general and specific requirements that apply to all sections of Divisions 22 and 23.

1.2 GENERAL REQUIREMENTS

A. Furnish all necessary labor, material, plant and equipment, including materials not specifically mentioned, but necessary to complete the job in a neat, correct and workmanlike manner.

B. The drawings and specifications shall be considered as supplementary, one to the other, so that materials and labor indicated, called for, or implied by the one and not by the other, shall be supplied and installed as though specifically called for by both.

1.3 SCOPE OF WORK

A. The intent of this specification, together with accompanying Plumbing Drawings is to provide a complete and operating plumbing installation, including, but not limited to the following principal items:

1. Install new plumbing fixtures, fittings, valves, etc. to provide a complete and operational plumbing system.
2. All fixtures, unless otherwise noted.
3. All soil, waste, drain, and vent piping.
4. Hot and cold water piping.
5. Connection to site water main approximately 5’ outside of the building as shown on the plans. Field verify and coordinate exact location with Site Utility Contractor.
6. Connection to site sanitary sewer at various locations approximately five feet (5') outside of building as shown on drawings. Coordinate and field verify exact locations and inverts with Site Utility Contractor.
7. Provide hot water circulating system as shown on drawings including all piping, valves, pumps, and controls. Pumps to be Bell & Gossett as indicated on plans and provided with immersion type aquastat and bulb well installed as recommended by the manufacturer.

8. All plumbing vent thru roofs (VTR's) shall be flashed by Roofing Contractor. All plumbing vent thru roofs (VTR's) shall be flashed by Roofing Contractor. All vent piping through roof shall terminate not less than 10’-0” horizontal distance from any and all air intakes.
9. Provide pipe, valves, fittings, etc. as required to connect water, and waste to kitchen equipment. Provide floor drains and floor sinks in serving kitchen. Coordinate all final connections and installation as required with kitchen equipment supplier.
10. Provide grease laden piping from existing kitchen to grease trap. Provide Schier GCI-1500 grease trap in ground outside of building. Coordinate exact location and inverts with all utilities. Grease trap sizing and construction shall meet the requirements of the sewer purveyor FOG program and shall be approved by the sewer authorities prior to ordering.

B. Bidders shall thoroughly familiarize themselves with conditions affecting this work, visiting the job site if necessary prior to submitting a bid.

1.4 DRAWINGS

A. Drawings are diagrammatic and do not indicate all offsets, fittings, and specialties. Examine other drawings, investigate conditions to be encountered and arrange work accordingly, furnishing all fittings, offsets, etc., required without extra charge.

B. Before construction of project starts, check location and inverts of existing and proposed pipes, sewers, and mains. Review other drawings for project, checking grades, elevations, locations of structural elements, locations and sizes of chases, type and method of construction of floors, walls and partitions. Report to Architect before start of construction any conflicts or unsatisfactory conditions. In no case shall Contractor proceed in uncertainty. No extra charge will be approved after start of construction for work resulting from failure to follow these instructions.

1.5 PERMITS, LICENSES, AND FEES

A. Plumbing Contractor shall obtain and pay for all permits, licenses, fees and service charges required for execution of this work. This includes all water and sewer taps required to provide a complete and operational system.

B. Work shall be installed according to local Plumbing Code and shall meet Plumbing Inspector's approval. Local codes shall apply where such codes exceed requirements of this specification. In absence of codes or authorities, install all work according to the 2021 International Plumbing Code.

1.6 STANDARD COMPLIANCE

A. Installation of all plumbing and piping system shall also comply with the following criteria:

1. Piping to be used for exterior potable water lines shall be approved by ASTM, AWWA, and/or ANSI. Piping shall have the approval of the National Sanitation Foundation (NSF).

2. All valves shall be in accordance with AWWA C500 regulations.
3. All pipe shall have a minimum cover of 24" except in vehicle traffic areas where a minimum cover of 36” is required.
4. Potable water hydrostatic pressure test shall be conducted in accordance with AWWA Standard C600-82, Section 4.1. The duration of this test shall be for a minimum of two (2) hours, and the test pressure shall be 1.5 times the design pressure or 150 PSIG, whichever is greater.
5. Gravity sewer system leakage test shall consist of plugging the end of the building sewer at the point of connection with the public sewer, filling the building sewer with water to a minimum of a 10-foot head and maintaining such pressure for fifteen (15) minutes.
6. A 10' horizontal separation shall be maintained between water and sewer lines. Where the horizontal separation cannot be met or where water and sewer lines must cross, then 18" vertical separation with water over sewer must be maintained. Where the above conditions cannot be met, water and sewer lines shall be cast iron and ductile iron pipe with joints staggered such that maximum separation between joints exist. The water line shall always be installed over the sewer line.
7. A visual inspection of the complete below grade and below slab sanitary sewer system shall be performed by camera as specified in other sections of this specification.

1.7 MATERIALS AND WORKMANSHIP

A. All materials and equipment shall be new and free from flaws and defects of any nature. Materials called for are to be considered as standards of quality; this, however, implies no right on part of Contractor to substitute other materials and methods without written authority from Architect. Materials and equipment manufactured outside of the United States will not be acceptable.

B. All work shall be performed by skilled mechanics under competent supervision, employing latest and best practices of the trade.

1.8 SUBSTITUTIONS

A. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified, shall be submitted for approval to the Architect ten days before bids are taken. Refer to Division 01 front end document requirements for additional requirements for substitution requests. Requests shall be accompanied by samples, descriptive literature, and engineering information, as necessary to fully identify and appraise the product. No increase in contract sum will be considered when requests are not approved. If the item is found to be equal, the Architect will issue an Addendum making it a part of the Contract Documents prior to bidding. After bidding, no further changes will be considered.

B. Plumbing Contractor shall be responsible for determining that all products submitted for approval meet given space limitations and maintain all required clearances for proper access and service.

1.9 SUBMITTAL

A. The Engineer will review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be for general compliance with the design and with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Engineer's review shall be conducted with reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviation from the Contract Documents not clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been made.

B. Prior to submittal of shop drawings to the Engineer, the General Contractor and the Plumbing Contractor shall review and approve shop drawings. Shop drawings which have not been reviewed and approved in writing by the Plumbing Subcontractor will not be reviewed by the Engineer. Plumbing Contractor shall state in writing on shop drawings, any proposed deviations from contract documents. Such deviations, if not stated in shop drawing submittals, shall be the sole responsibility of the Plumbing Subcontractor. **Note: In addition to the General Contractor's approval and stamp, the first page of each shop drawing submittal must contain the words "APPROVED" or "APPROVED AS NOTED" and must be signed and dated by the Plumbing Subcontractor before the Engineer will review them.**

C. Review rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail; said review does not in any way relieve this contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

D. Architect and/or Engineer are not responsible for number of fixtures, units, etc. designated on Shop Drawings. Plumbing Contractor shall be fully responsible for providing the correct quantity to accomplish a complete job as specified and drawn.

E. Shop Drawings: After award of Contract, and before any materials of this Section are delivered to the job site, submit Shop Drawings to Architect in accordance with the requirements listed below and in accordance with the provisions of the Architectural Section of these Specifications.

1. After securing tentative approval on all items pending shop drawing submission, the contractor shall submit for approval, manufacturer's shop drawings of all equipment, and shop drawings to scale of all fabricated work furnished under this Section of the specifications including piping, fixtures, fittings, equipment layouts, supports and equipment foundation pad layout. Shop drawings shall be of scale large enough to clearly indicate all details of work. Plumbing/Mechanical rooms, pump rooms, water heater/boiler rooms shall be submitted on a scale of not less than 1/4-inch equals one foot.
2. Where colors or finishes are specified for products, a sample showing the color or finish shall be submitted with the shop drawings.
3. Where high efficiency motors have been specified, submit certification of motor efficiency with shop drawings for each motor of one horsepower or greater.

F. Material List: Accompanying the shop drawings, submit a complete list of all materials proposed to be furnished and installed under this Section, giving manufacturer's name and catalog number, sizes, capacities, model numbers, accessories and other pertinent information for each item to indicate full compliance with drawings and specifications; this shall in no way be construed as permitting substitution except as specifically provided in the Architectural Section of these specifications. Every device or piece of equipment herein specified by model and manufacturer shall be submitted for approval. Partial lists submitted from time-to-time will not be permitted.

G. Plumbing/Electrical Coordination: Before equipment is ordered and after all motors, loads, controls, and other characteristics of equipment are known, the Contractor shall review the data shown on the Electrical drawings. Special attention shall be given to motor size, starters, means of disconnect, control wiring, etc. that are being furnished under the electrical section of the specifications. At the time of shop drawing submittal, the contractor shall by letter to the Engineer point out any discrepancies and describe the proposed corrective action.

1. Prior to start of construction, contractor shall submit a starter schedule for review by Engineers. This schedule shall contain equipment description, starter manufacturer and model number, starter accessories, control voltage and source of starter power and control circuitry.
2. No extra charge will be approved after start of construction for work resulting from failure of contractor to follow these instructions.

H. Record Drawings: Contractor shall maintain on the job site one complete set of the plumbing drawings for this project. All changes authorized by the Architect as to the location, sizes, etc., of piping, fixtures, and other plumbing equipment shall be indicated in red ink on the plumbing drawings as the work progresses. At the completion of the project, Contractor shall deliver a complete set of "Record Drawing" prints of the plumbing drawings to the Architect.

I. Manual: Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Owner through the Architect two copies each of a Manual compiled in accordance with the provisions of the Architectural Section of these specifications; and also include in each copy of the Manual a copy of the Record Drawings, operating and maintenance instructions, approved spare parts lists, name and address of local service representatives and all warranty certificates for new equipment.

1.10 EXCAVATING AND BACKFILLING

A. Plumbing Contractor shall do all excavating and backfilling for installation of work included under this contract and he shall promptly remove from the premises all excess earth, debris, and trash for which he is responsible.

B. Install sewer and water pipes in separate trenches, graded uniformly to provide solid bearing and required fall. Upon completion of tests and inspections, backfill with approved material in 12” lifts, tamped to 95% relative compaction. Lifts less than 12” are allowed with adequate protection of the pipe. Lifts more than 12” must be approved by the engineer.

C. **Flush, clean, and scope all below slab waste piping with camera prior to slab being poured.** Camera scope shall take place immediately after water has been drained from the pipe and after backfill and compaction. Provide video to engineer in ample time for review prior to any scheduled slab pour. If areas of below slab piping are determined to be unsatisfactory, the contractor shall remove and repair piping to a satisfactory condition. Upon completion of the project, the contractor shall camera below slab pipe, and provide a video of final conditions with description of pipe location to the owner through the architect. All video shall be provided by electronic media and are to be accompanied by a voice description of the pipe size and location that matches the piping as shown on the plumbing drawings.

1.11 CUTTING AND PATCHING

A. General Contractor will do all cutting, patching, and construction of chases within the building for this installation. Plumbing Contractor shall advise General Contractor well in advance of sizes and locations of all chases, openings, sleeves, etc., required for this installation. Failure to do so will result in Plumbing Contractor bearing costs for this phase of the work.

1.12 PROTECTION OF FIXTURES, EQUIPMENT AND MATERIALS

A. Protect all fixtures and equipment against damage of any nature. During construction, pipe openings, drains, etc. shall be protected with plugs or caps.

1.13 SPACE CONDITIONS

A. All materials and equipment shall conform to the space limitations. Maintain maximum headroom and space clearances at all points.

1.14 GUARANTEES

A. The Contractor agrees:

1. To correct defects in workmanship, materials, equipment and operation of system for a period of one year from date of acceptance. Equipment and materials, repaired or replaced are guaranteed for one year following date of correction.
2. To remove any item not specified or given approval and replace it with specified item.
3. Any item submitted for approval that does not conform to these specifications shall have accompanying note of exception.
4. That the system as installed shall comply with code requirements.
5. To repair any damage to building and equipment resulting from defects in workmanship, new materials, new equipment, and system operation.

PART 2 - EQUIPMENT

2.1 PIPING

A. Water Piping:

1. All pipe shall conform to Chapter 6 of the 2021 edition of the International Plumbing Code.
2. All pipe, fittings, valves, faucets, etc., or any product used for dispensing potable water shall be fully compliant with the “Reduction of Lead in Drinking Water Act” and shall meet the requirements of NSF 61 and NSF 372 test standards.
3. Copper pipe shall be as manufactured by Mueller, Cerro, or Howell. Fittings shall be Nibco or Elkhart.
4. PEX piping shall be PEX-a tubing manufactured and listed to ASTM F876 and F877 and CSA B137.5, certified to NSF Standards 14 and 61 and listed by the Hydrostatic Stress Board of PPI at 200ºF at 80psi, 180ºF at 100psi and 73.4ºF at 160psi. PEX piping shall be Uponor AquaPEX or prior approved equal.
5. Pure water pipe and fittings shall be manufactured to Schedule 80 iron pipe dimensions from virgin, unpigmented, Type I homopolymer polypropylene, meeting ASTM D4101 using no plasticizers or pigments.
6. Provide drains at all low points of water piping.
7. Unless otherwise noted, piping within building shall be run concealed, installed straight, without sags. Cut all pipe ends square, ream, and cleaned of all dirt, scale, etc., before assembly. Offset pipes as required to pass columns, beams, etc.
8. All fixtures shall have shock absorbers as specified to prevent "water hammer". All lavatories and sinks shall be furnished with hot and cold water shock absorbers by Souix Chief , “mini-rester” size AA, or equal product by PPP or Watts. All flush valves or other quick-closing devices shall be protected with specified shock absorbers. All plumbing fixtures are to be trapped and contain chrome plated stops and nipples on all supplies.
9. Floor drains shall be provided with specified trap primer connections and supplied from trap primer valves as specified herein and shown on drawings. All routing of primer lines shall be concealed in walls and/or below floors. Where trap primers are not shown on the drawings, provide floor drains with trap seal inserts by Proset Trap Guard or approved equal.
10. Provide unions and isolation valves at each piece of equipment, tank, or other device requiring removal or isolation for service.
11. Where valves are installed above hard ceilings, the contractor shall provide paintable galvanized steel access doors large enough for access to and replacement of each valve.

12. Install dielectric insulated couplings or unions where joining dissimilar metals in water piping systems. Dielectric coupling and unions shall be by Epco, Mayco, or approved equal.

13. Where water pipe is installed outside of the building heated envelope, provide self-regulating heat trace including all connections, terminations, controls, etc. as required for a fully operating system. Coordinate heat control / power location with electrical contractor. Heat trace shall be Thermon BSX self-regulating 5 watts / ft. or approved equal.

14. Furnish and install all water piping as indicated on plans using materials as tabulated below: (change or add water piping type for specific project)

    a. Water piping shall be copper, hard drawn, with wrought copper fittings, soldered (95-5). All new water lines above grade, within building shall be Type L. All new water lines below grade shall be Type K, copper.

B. Soil, Waste, Drain, and Vent Piping:

1. All pipe shall conform to Chapter 7 of the 2021 edition of the International Plumbing Code.
2. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
3. Cast iron sewer pipe and fittings shall be asphaltum coated, bell and spigot type, conforming to ASTM Specification A-74 with rubber gaskets conforming to ASTM Specification C-564, or if specified below the no-hub type with stainless steel couplings with neoprene gaskets, conforming to CISPI Specification 301 or 310 and ASME Specification A-888 and C-1277 for shielded no-hub pipe. Each length of pipe and each fitting shall be plainly marked with the manufacturer's initials, or registered trademark, and with letters to indicate the proper classification as below:
   SV----------Service
4. Plastic drain pipe shall be solid core schedule 40 PVC-DWV pipe, ASTM D-2665. Cellular core PVC is not acceptable. Each length of pipe and each fitting shall be plainly marked with the manufacturer's initials or registered trademark and shall have the NSF seal of approval CS-272-65-5.
5. Below slab and below grade acid waste piping shall be schedule 40, Type II Co-Polymer, non-fire retardant polypropolyene drain pipe with fused joints. Above slab acid waste piping for all science lab sinks and drains shall be schedule 40, Type II Co-Polymer, fire retardant polypropolyene drain pipe with mechanical joints. Acid waste piping in return air plenums shall be Polyvinylidene Fluoride (PVDF) meeting ASTM E-84 and UL 723 standards for flame spread and smoke generation.
6. All changes in direction of soil, waste, and drain piping shall be made using only sanitary drainage pattern fittings. Changes in direction shall be made by use of 45 degree Y's, long sweep quarter, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Short radius quarter bends may be used only where direction of flow is from horizontal to vertical. Running threads, bands, saddles, tapped tees, and tapped crosses will not be allowed in drainage lines. Tapped sanitary tees and crosses are acceptable where allowable by the plumbing code. Provide thrust restraint at changes of direction as specified herein.
7. Install horizontal soil, waste, and drain piping at a uniform slope of not less than 1/4" per foot for pipe 2" and smaller, and not less than 1/8" per foot for 3” and larger pipe.
8. Pitch each vent pipe down in direction of fixture it vents so that no condensation will be trapped.
9. Connection of soil and waste piping to existing sanitary sewer and fixtures shall be properly adapted for dissimilar materials.
10. All No-Hub pipe joint connections shall be made with Husky Industries SD-4000 heavy duty bands, or equal by Clamp-All, and gaskets unless approved otherwise by the Engineer.
11. All No-Hub sanitary piping 5” and larger shall be braced at every branch opening or change of direction by the use of B-Line 3134 pipe clamps with a minimum of two rods or Holdrite Series 117 pipe restraint in addition to the no-hub couplings listed above.
12. Furnish and install all soil, waste, drain, and vent piping as indicated on plans using materials as specified below:

    a. Soil, waste, drain, and vent piping above slab within building, shall be asphaltum coated standard weight cast iron no-hub pipe with no-hub fittings, and specified stainless steel couplings with neoprene gaskets and specified pipe restraint.

b. Soil, waste, drain ,and vent piping below grade and below slab inside and outside of the building, shall be 40 PVC-DWV pipe, ASTM D-2665 with solvent fused DWV fittings.

13. **Double combinations of any kind will not be allowed in PVC-DWV piping in the horizontal position.**

2.2 PIPE SUPPORTS

A. When copper piping is to be insulated, steel hangers or clamps will be acceptable if a pipe sleeve is provided between the insulation and hanger or clamp. This sleeve is required in order to prevent crushing of the insulation. The acceptable hangers or clamps are those specified above for soil and vent pipe supporting. Pipe sleeves must be secured to hangers to prevent slipping off hangers or clamps.

B. All piping buried below grade shall be supported throughout its entire length on a firm bed of earth or with concrete pad as required in order to ensure that pipes will not settle in the future.

C. All pipe roughing work to final users in metal or wood studded sheet rock walls shall utilize "Holdrite" brackets and inserts or an engineer-approved equal system. Plumbing Contractor shall be responsible for the proper bracket selection depending on pipe materials being supported. Contact Engineer if material selection assistance is required or for approval of alternate support system.

D. Properly selected pipe clamps, brackets, and bracing shall be utilized for the support of pipe in masonry wall construction. Carriers shall be used where specified.

E. Regardless of methods used, final product shall display no movement of the water and waste pipes from the finished side of the wall.

F. Insulation to run continuous through pipe saddle type hangers.

2.3 SEISMIC RESTRAINTS

A. All piping and equipment suspended from structure, where the distance from the top of the pipe or equipment to the bottom of the structure is more than 12", shall be provided with seismic cable restraints or other restraints as required by the IBC. Cabling system shall be sized and installed in accordance with manufacturer's recommendations for compliance with Chapter 16 of the International Building Code. Seismic restraint systems shall be by Mason Industries of approved equal, and shall be designed and sealed by the manufacturer’s engineer.

2.4 PIPE HANGERS AND SUPPORTS

A. The contractor shall furnish all labor, materials, equipment and incidentals and install pipe hangers, supports, concrete inserts, and anchor bolts including all metallic hanging and supporting devices for supporting exposed piping.

B. Hangers and supports shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for pipe supports shall be five (5) times the ultimate strength of the support. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, the contractor shall submit a certification stating that such requirements have been complied with.

C. Submit to the Engineer for approval shop drawings of all items to be furnished under this section.

D. Submit to the Engineer samples of all materials specified herein if requested. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and secure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe and personnel contact.

E. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with regard to tests and physical and chemical properties, and be in accordance with MSS SP-58.

F. All hangers, rods, inserts, supports, supplementary steel, and all materials for hanging systems where installed outside of the building conditioned envelope shall be type 304 stainless steel.

G. Hangers and supports shall be spaced in accordance with MSS SP-69 Table 3.

H. Pipe hangers and supports shall be as manufactured by B-Line Systems, Inc. or equal by PHD, Anvil, or Erico. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product shall not be considered as proprietary. Any item comparable in type, style, quality, design and performance will be considered for approval.

I. Pipe Hangers and Supports for Metal Pipe:

1. Suspended single pipes shall be supported by hangers suspended by steel rods from galvanized concrete inserts, beam clamps, or ceiling mounting bolts as listed in following sections.
2. All hangers, rods, inserts, supports, supplementary steel, and all materials for hanging systems where installed outside of the building conditioned envelope shall be type 304 stainless steel.

J. Hangers:

1. All hangers and supports shall have some form of adjustment available after installation. Hanger material shall be compatible with the pipe material.
2. Hangers for steel pipe shall be B-Line Systems, Inc. figures B3100, B3102, B3170, and B3173 or equal. B-Line Systems, Inc. figures B3174 and B3198 or equal are acceptable for use on piping 2 inch and smaller.

3. Hangers for copper tubing shall be B-Line Systems, Inc. figures B3104CT, B3170CT, B3173CT, and B3198CT or equal. Felt isolator pads may be used on carbon steel hangers supporting stainless steel pipe or copper tubing.
4. Support long horizontal runs of hot insulated steel piping subject to 1/2" or more longitudinal thermal expansion with B-Line Systems, Inc., figures B3110 or B3114 roller hangers with a figure B3160 series protection saddle or equal. Cast iron rollers shall not be subjected to temperatures above 450ºF.

K. Hanger Rods:

1. Hanger rods shall be B-Line Systems, Inc. figures B3205 and ATR or equal.
2. Hanger rods shall be subjected to tension only. Lateral and axial movement shall be accommodated by proper linkage in the rod assemble.
3. Hanger rod diameters shall be based on MSS SP-69 Table 4.

L. Concrete Inserts:

1. Concrete inserts for pipe hangers shall be continuous metal inserts designed to be used in ceilings, walls, or floors, spot inserts for individual pipe hangers and shall be as manufactured by B-Line Systems, Inc. or equal and shall be as follows:

    a. Continuous concrete inserts shall be used where applicable and shall be used for hanger rod sizes up to and including 3/4" diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be B221, B321, or B521 by B-Line Systems, Inc. or equal.

    b. Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8" diameter. Inserts shall be figures B2505 thru B2508, B2500, or B3014 by B-Line Systems, Inc. or equal.

M. Welded Steel Brackets:

1. Wall or column supported pipes shall be supported by welded steel brackets equal to B-Line Systems, Inc. figures B3063, B3066, and B3067 or equal as required for pipe sizes up to and including 20" diameter.

N. Stanchions:

1. Floor supported pipes 3" and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports as directed by the Engineer. In general, concrete supports shall be used when lateral displacement of the pipes is probable (unless lateral support is provided), and adjustable pipe saddle type supports shall be used where lateral displacement of the pipes is not probable.
2. Each adjustable pipe saddle support shall be screwed of welded to the corresponding size base stand. Supporting pipe shall be of schedule 40 steel pipe construction. Each base stand shall be secured to the concrete floor by expansion bolts. Adjustable saddle supports shall be equal to B-Line Systems, Inc. figure B3093 with B3088T or B3090 with B3088.

O. Riser Clamps:

1. Riser piping shall be supported independently of any connected horizontal piping if possible.
2. Support all vertical runs of ambient piping at each floor or as specified with B-Line Systems, Inc. figures B3373, B3131, B3373CT as required or equal.

P. Pipe Clamps:

1. Where flexibility in the hanger assembly is required due to horizontal pipe movement, use pipe clamps. For non-insulated pipe use B-Line Systems, Inc. figures B3140 or B3142 or equal. For insulated pipe use B-Line Systems, Inc. figures B3144 or B3146 or equal.

Q. Trapeze Hangers:

1. Strut channel trapeze hangers shall be used to support parallel piping. Pipe racks or stanchions fabricated with strut channel shall be used in areas of multiple pipe runs. Strut clamps, straps, and rollers will be used to maintain proper alignment. Strut shall be B22 or heavier as required as manufactured by B-Line systems, Inc. or equal. Clamps and straps shall be B2000 series or B2400 series by B-Line Systems, Inc. or equal. Rollers shall be B-Line Systems, Inc. figures B218, B219, B379, B479, or B3126 or equal.

2.5 PIPE SLEEVES

A. Whenever pipes pass through masonry walls, floors, and partitions, furnish and install cast iron pipe sleeves of sufficient size to allow bare pipes, or pipes plus insulation if applicable, to pass through easily. Fill annular spaces between sleeves and pipes with tightly caulked waterproof compound wherever sleeves are installed in walls below grade or in concrete floor slabs. Fill spaces between sleeves and pipes with tightly caulked approved type fireproof compound wherever sleeves are installed in walls above grade.

B. All pipe penetrations of fire and or smoke rated walls, floors, and partitions shall be sealed in compliance with U.L. regulations and as detailed on Plumbing Drawings. Where details are not shown on drawings, it shall be the contractor’s responsibility to comply with the U.L. requirements for sealing penetrations based on the ratings as indicated on the architectural plans.

C. All below slab pipe sleeves shall be schedule 40 PVC-DWV pipe ASTM D-2665 and shall be sealed water tight.

2.6 ESCUTCHEONS

A. Furnish and install chrome plated floor and ceiling plates where pipes pass through walls, floors, and ceilings in exposed areas. Plates shall be Crane Co. No. 10-BC, or similar products by Grinnell Co., or approved equal.

B. All split ring escutcheons shall be secured to wall with screws aligned horizontally for a neat and permanent installation.

C. All slip-on type escutcheons shall be tight and secure to finished wall.

2.7 FLASHING

A. Where pipes pass through roof, flash with a 30" square of four-pound sheet lead or 16 ounce copper. Turn flashing up a minimum of 6", and install flashing sleeve or turn down lead flashing a minimum of 2" into pipe. Rubber flashing collars are not acceptable except if required by the roofing system installed.

2.8 CLEANOUTS

A. Furnish and install all cleanouts by Zurn, or approved equals by Jay R. Smith or Josam, as indicated in this specification and on drawings. Cleanouts shall be same diameter as lines in which installed up to 4" size, and not less than 4" in size for larger pipe. Cleanouts to grade shall be set in 18" x 18" x 6" concrete pad. Where floor cleanouts are installed above slab on grade, provide with clamping collar and 30” square waterproofing membrane. Membrane shall be compatible with floor type and shall be sealed to prevent water penetration to the floor below.

2.9 FLOOR DRAINS

A. Floor drains shall be Zurn, or approved equals by Watts, Jay R. Smith or Josam, as specified in this specification and on the Plumbing Drawings. Where floor drains are installed above slab on grade, provide with clamping collar and 30” square waterproofing membrane. Membrane shall be compatible with floor type and shall be sealed to prevent water penetration to the floor below.

2.10 HOSE BIBS AND HYDRANTS

A. Non-Freeze Wall Hydrants shall be Woodford 67 / B67. Approved equals by Zurn. Interior hose bibs shall be Woodford 24CH.

B. Install a Watt NO. 8 vacuum breaker or equal, by Nidel on each hose bib or hydrant, if backflow preventer is not furnished with unit.

2.11 VALVES

A. Valves:

1. All valves for use in potable water systems shall be fully compliant with the “Reduction of Lead in Drinking Water Act” and shall meet the requirements of NSF 61 and NSF 372 test standards. Where the manufacturer produces both a compliant and non-compliant valve, the low lead version of the valve shall be used and shall bear the seal of certification to identify the product.
2. Valves shall be designed for 125 psi working pressure minimum, and valve bodies shall be stamped accordingly. Install all valves with stems above horizontal. Valves shall be Nibco Inc., of size and type indicated below, Milwaukee Valve Co., or approved equals. All valves for domestic potable water piping 2-1/2” and smaller shall be two-piece full ported ball valves Nibco 585-66-LF or approved equal.

3. All ball valves on domestic water piping to be Nibco with blowout proof stems.
4. All valves to be located within 2ft. of ceiling for ease of access for maintenance purposes.
5. All valves to be line size unless otherwise noted.

Type	Size	Body Material	Type Connection	Nibco No.
Gate Valves	**2" and smaller**	Bronze	Soldered	S-111
Gate Valves	2" and smaller	Bronze	Screwed	T-113
Gate Valves	2 1/2" and larger	Iron	Screwed	T-619
Gate Valves	2 1/2" and larger	Iron	Flanged	F-619
Check Valves	2" and smaller	Bronze	Screwed	T-413
Check Valves	2 1/2" and larger	Iron	Screwed	T-918
Check Valves	2 1/2" and larger	Iron	Flanged	F-918

2.12 FIXTURES

A. Unless otherwise specified, all fixtures shall be products of a single manufacturer. Fixtures shall be new, first quality and complete with supply pipes, stop valves, traps, faucets, escutcheons, hangers, etc. All trim and exposed piping shall be chrome plated.

B. Fixture connections between earthenware fixtures and drainage pipes shall be means of cast brass flanges, caulked, soldered, or screwed to drainage pipes. Each connection shall be bolted using a graphite asbestos ring gasket fixtures and floor flanges.

C. Equal Products:

1. Water closet seats may be approved equal by Beneke, Bemis, Church, Olsenite, Centoco or the Fixture Manufacturer.
2. The flush valves are specified as Sloan. Approved equals by Zurn.
3. Faucets and Fittings are specified by Chicago. Approved equals by T&S Brass, Delta Commercial, or Moen Commercial.
4. Shock absorbers are specified by Souix Chief, but equals by Zurn, Jay R. Smith, Wade, or Josam are acceptable. All shock absorbers or water hammer arrestors shall meet the PDI sizing requirements.
5. Water Coolers are specified by Elkay, equals by Oasis are acceptable.
6. Janitor’s sinks and mop basins are specified by Florestone, equals by Stern-Williams or Fiat are acceptable.
7. Sinks are specified by Elkay, equals by Just are acceptable.
8. Backflow Preventers are specified by Watts, but equals by Conbraco are acceptable.

D. Shop drawings shall be submitted regardless of manufacturer. Regardless of which manufacturer's product is being submitted the quality of those specified must be maintained.

E. Fixtures as specified on Drawings shall be manufactured by Kohler, or approved equals by American Standard.

F. Where sinks are installed in cabinets, contractor shall verify sink dimensions with cabinet shop drawings prior to ordering. Conflicts between cabinets and sinks shall be brought to the attention of the architect and engineer. Failure to follow these instructions shall result in the contractor bearing the cost of replacement in the event sinks do not fit the cabinets as constructed.

G. Where hard-wired sensor operated flush valves and faucets are specified, the Plumbing Contractor is to provide all control wiring from transformer to sensors.

2.13 WATER HEATERS

A. Tank water heater shall be State or approved equal by A.O. Smith as specified in this specification and on Plumbing Drawings. Each heater shall have UL label and shall be furnished with ASME rated P&T relief valve and shall meet the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1. Water heaters exceeding 120 gallons or 200,000 BTUH input shall be ASME rated and meet all requirements of the applicable boiler safety code. Discharge from each relief valve shall be extended with type "l" hard drawn copper, full size of discharge opening, piped to within 6" of floor and end of pipe cut at 45 degree angle.

B. Tankless water heaters shall be Rinnai or equal by A.O. Smith and shall be provided with manufacturer’s valve package and all installation hardware as required for the applicable installation.

C. IMPORTANT NOTE TO CONTRACTOR – It is the Plumbing Contractors responsibility to verify the exact power supplies to water heater with the Electrical Contractor prior to ordering and installing units. Failure to verify voltages and changes to water heater(s) after delivery will be at the Plumbing Contractors expense, and no change in contract will be allowed, nor will any cost to the Architect, Engineer or Owner be accepted.

D. When a floor drain is not provided for water heater P&T relief valve discharge, water heaters shall rest in either a high impact plastic pan or a 24 gauge galvanized sheet steel water tight metal pan as specified in this specification and on drawings.

2.14 AIR CHAMBERS

A. Air chambers are not to be installed. Provide and install Souix Chief “mini-retser”, size AA, or equal product by PPP or Watts, on hot and cold water supply pipe to each fixture or branch of fixtures, except where a water hammer arrester is shown for a bank of fixtures, in place of air chambers. Water hammer arresters shall be Souix Chief as specified in this specification and on plumbing drawings, or approved equal by Wade, J. R. Smith, Zurn or Josam.

2.15 INSULATION

A. Insulate all water pipe, horizontal roof drain piping, and sanitary sewer piping which receives condensate from mechanical units and or discharge from ice machines/makers, above grade with 1" thick fiberglass pipe insulation, 3 lb. density, Gaston-Baron Snap-on, Owens Corning Fiberglass, or Knauf with standard vapor barrier jacket. Seal all seams and joints with waterproof mastic. In exposed interior areas, such as mechanical rooms, cover insulation with 10 oz. canvas jacket secured and treated with aerosol adhesive and install PVC jackets at all elbows, joints etc. Cover insulation in exterior exposed areas with .016" corrugated aluminum jacket. Secure jacket with bands and seal water tight in accordance with manufacturer's instructions.

B. Application:

1. Insulation shall be installed in strict accordance with the manufacturer's recommendations for the application. Elbow fittings shall be "stovepipe" miter and tees shall be "fishmouth"/saddle joints. All butt joints and miter joints shall be sealed with vapor proof mastic and shall be applied in accordance with the manufacturer's instructions for the pipe type and fluid being conveyed as well as the ambient conditions of application.
2. Where pipe is installed in block walls, water resistant closed cell foam insulation may be used. Insulation shall be slid over the pipe to maintain vapor barrier. Fittings shall be mitered as specified for fiberglass insulation and shall be joined and sealed by the manufacturer's recommended sealant or factory approved contact adhesive.
3. Outside supporting hangers shall be designed to resist compression; supporting devices such as short wood dowels or wood blocks shall be used in combination with galvanized sheet metal hanger shields. The wood supporting devices shall be the same thickness as the insulation and sealed to the insulation with factory approved contact adhesive.

C. Insulation on all water piping shall be run continuously. A steel pipe sleeve or saddle shall be used between the hanger or clamp and insulation to prevent crushing of the insulation. Insulation of the hanger or clamps will not be required.

2.16 IDENTIFICATION OF PIPING

A. Label all piping in Equipment Rooms, above "Lay-In" type ceilings and all other accessible locations. Pipe markers shall conform with Scheme for Identification of Piping Systems (ANSI A13.1-1956).

B. Each marker shall show the name of the fluid in the pipe and a directional flow arrow, both superimposed on one of the five basic background colors. Pipe markers shall be installed at each service valve, at each mechanical item of equipment, at 20-foot intervals on horizontal runs of piping, and at midpoints of risers on vertical piping. Where horizontal runs of piping above the ceilings crosses over multiple rooms, and the room walls run up to the deck, a marker shall be installed on the pipe in each room regardless of the 20 foot interval requirement.

C. The identifiers shall be plastic strips on which the name of the service shall be printed. The identifiers shall be installed with an adhesive which will adhere to the pipe or insulation without deteriorating. Each piping system shall have a different color code marking. Colors shall be submitted for approval. Identification markers shall be applied over the insulation on insulated pipe. The identifiers shall be Brady or Seton self-sticking pipe markers and combination arrow tape meeting the requirements of ANSI standards. Where approved by Engineers stenciled labeling may be accepted.

2.17 VALVE IDENTIFICATION

A. Tag all valves with brass identification tags and provide a typed and laminated valve schedule at locations to be determined by the owner. A schedule shall be provided for each project, located in a mechanical room or at a location of owner's request. Also include valve schedule in each copy of the O & M manual. Tags to be 1-1/2" diameter brass tags with 1/4" letters identifying the valve service (PLBG, HW, CW, etc.) above 1/2" valve numbers. Valves tags to be by Seton or equal. A 1" tall white engraved black marker with 1/2" white letters shall be placed on the wall 1" below the ceiling grid or on the ceiling grid at each valve location. Final location of the valve tags – on wall or grid – shall be approved by the architect. The tag shall bear the identification mark of the corresponding valve. Where hot and cold water valves are located adjacent to each other, only one wall tag is required. The contractor shall provide electronic copy of the valve schedule and floor plan in PDF format with all water piping shown indicating the locations of each valve by number.

PART 3 - EXECUTION

3.1 TESTS

A. The Contractor shall conduct and bear the cost of all necessary tests of the plumbing work, furnishing all labor, power and equipment. The contractor shall notify the engineer at least forty-eight (48) hours prior to all testing. Any test conducted without the Engineer present shall be considered as having not been performed, and such systems shall be retested in the presence of the Engineer at the expense of the contractor.

B. Any delays or additional cost to the project that result from the failure of the contractor to properly test all systems shall be the sole responsibility of the contractor.

C. Leak test hot and cold water pipes at 150 psi hydrostatic pressure before covering. Blank off equipment not designed for test pressure.

D. Test entire sanitary, drainage, and venting systems by plugging all necessary openings, and filling systems with water to the level of the highest vent stack. Not less than ten feet of water pressure will be acceptable. If required by local plumbing code, perform smoke test. **Flush, clean, and scope all below slab waste piping with camera prior to slab being poured.**

3.2 DISINFECTING WATER PIPING

A. Before being placed in service, all new water piping and repaired portions of existing piping shall be thoroughly flushed then chlorinated with not less than fifty parts per million (50 ppm) of available chlorine. Chlorine gas or seventy percent high-test calcium hypochlorite can be used. Water from the existing distribution system or other source of supply shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The solution shall be retained in the pipeline for not less than twenty-four (24) hours and a chlorine residual of 10 ppm shall be available at this time. Then the system shall be flushed with potable water and the sampling program started.

B. Sampling shall consist of taking two (2) or more successive sets of samples, taken at 24-hour intervals and tested by a State approved private laboratory. Test results shall indicate bacteriologically satisfactory water. Should any reports be unfavorable, the entire treatment and sampling process shall be repeated. Satisfactory test results shall be submitted to the appropriate governmental agency.

3.3 CLEAN UP

A. Prior to acceptance of the building, thoroughly clean all exposed portions of the plumbing installation, removing all labels and all traces of foreign substances, using a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION 220000

SECTION 230200 - GENERAL REQUIREMENTS MECHANICAL

PART 1 - GENERAL

1.1 SPECIAL NOTES

A. Work under this section of the specifications shall be governed by requirements there under.

B. The use of the word "PROVIDE" in the specifications and on drawings for work under this section shall mean: Furnish and install complete, supplying all necessary labor and materials.

C. This section applies to all sections of Division 23 of this project except as specified otherwise in the individual sections and here-in. Work described in this section includes general requirements common to all mechanical systems. Provisions of this section apply to all mechanical specification sections.

D. The contractor’s attention is directed to the intention of the specifications to provide domestic manufactured products only for this project. Where non-domestic products will only be considered on a individual product basis and will only be accepted if prior approval is received before the project is bid.

1.2 GENERAL REQUIREMENTS

A. Provide necessary labor, material, plant and equipment including materials not specifically mentioned, but necessary to complete the job in a neat, correct and workmanlike manner.

B. The drawings and specifications shall be considered as supplementary, one to the other, so that materials and labor indicated, called for or implied by the one and not the other, shall be supplied and installed as though specifically called for by both.

C. All electrical equipment shall be UL listed and all gas equipment is to be AGA certified.

D. All items shall be properly lubricated and in perfect operation upon completion of the project and prior to final acceptance by owner.

E. Contractor shall be held responsible for having visited job site and having familiarized himself with existing conditions prior to submitting bid. If any existing problems are identified, notify Architect in writing prior to submitting bid.

1.3 SCOPE

A. Provide the necessary labor and material to remove portions of the existing HVAC system as detailed on the demolition plans.

B. Provide a complete Heating, Ventilating, and Air Conditioning system as specified here-in and as indicated on the accompanying Mechanical Drawings for the entire building.

C. Provide single package rooftop heat pumps with auxiliary electric heaters together with all necessary ductwork, supply and return grilles, economizer systems, powered exhaust systems, and thermostatic control as here-in specified and indicated on drawings.

D. Provide restroom exhaust systems. Systems shall consist of exhaust fans, sheet metal ductwork, door grilles, controls, and all items required for a complete and operating system.

E. Insulate all sheetmetal supply and return ductwork.

F. Provide all control, interlock and starting circuit wiring. Wiring shall be 120 volts or less. Provide transformers and relays as required to comply with this requirement. Conduit shall be steel conforming to the requirements of the Electrical Specifications, except as otherwise specified. NO PLENUM CABLE WILL BE ALLOWED FOR INSTALLATION OF CONTROLS FOR THIS PROJECT.

G. Start, test, adjust, balance and place into operation all systems. The building water and air distribution systems are to be balanced to provide the quantity of air and water as shown on drawings. System air balance is to be accompanied with certified test forms (attached) as to obtained air quantities. Proper fan performance and coil discharge air temperature reading shall also be certified on test forms (attached).

1.4 SPACE CONDITIONS

A. All work shall fit the spaces available. Verify all dimensions of the work before commencing fabrication and/or installation. Minor deviations from the drawings required to conform to space conditions and to provide the required accessibility shall be made at no additional cost to Owner.

B. Only base manufacturer's equipment has been investigated and determined to meet necessary space conditions. It shall be the responsibility of the approved equal manufacturer and contractor to verify their suitability for use on this project.

1.5 DRAWINGS

A. The Plans are not intended to show all ductwork, pipes, valves, fittings, connections, and details of the work to be done. The piping, duct, and equipment locations shall be adhered to as closely as possible; however, any changes necessary to avoid columns, beams, lighting fixtures, ductwork, sprinkler piping, etc., shall be made at no additional cost to the Owner.

B. Conflicts in the plans and specifications where changes and alterations are necessary, or where exceptions are taken by the Contractor with regard to sizes, locations, and other details indicated on the drawings, they shall be discussed with the Architect and have his consent in writing before any changes are made. The Contractor shall confer with the Architect for the exact location of all openings into finished areas and all equipment and piping locations before proceeding with the work.

C. The drawings of this work were prepared in conjunction with the other trades and plans of the project and it shall be the Contractor's responsibility to provide himself with drawings of the other trades as required and to coordinate and schedule the work with the other trades.

D. Should any difficulties prevent the installation of the work as indicated, the proposed changes shall be submitted to the Architect in detail and must be approved in writing before the work may be performed.

E. All inverts, locations, and elevations on all piping, equipment, trenches, etc. shall be verified on the job site prior to the performance of any work that may be affected in any manner by said inverts, locations, and elevations. Before construction of project starts, check location of proposed equipment and ductwork. Review other drawings for project, checking locations of structural elements, locations and sizes of chases, type and method of construction of roof, ceilings, walls, and partitions. Report to Architect and Engineers before start of construction any conflicts or unsatisfactory conditions. In no case shall Contractor proceed in uncertainty. No extra charge will be approved after start of construction for work resulting from failure to follow these instructions.

F. Where connections and drains are provided to serve specific pieces of equipment, it shall be the Contractor's responsibility to verify the exact location of the equipment connections and drains and no installation shall be attempted until exact locations have been established. This applies to all equipment regardless of who furnishes said equipment.

1.6 PERMITS, LICENSES, AND FEES

A. The installation of the systems covered by these specifications shall conform in strict accordance to all ordinances, codes and regulations of the State and DHEC and shall conform to all applicable requirements and recommendations of the NFPA. These requirements are the minimum and shall be complied with at no additional cost to the Owner.

B. In the absence of local regulation and codes, on heating, ventilating, or air conditioning, or in items or circumstances not covered by local regulation and codes, all recommendations and requirements of ASHRAE, as set forth in the current editions of the applicable ASHRAE Guides, shall be met as well as all requirements and recommendations of NFPA 90A and the International Building Code.

C. Where requirements of the drawings and specifications exceed code requirements, the work shall be provided in accordance with the drawings and specifications. Any work provided contrary to these requirements shall be removed and replaced at the Contractor's expense.

D. The Contractor shall obtain and pay for all necessary permits and inspections required for the installation of this work and shall pay all charges incident thereto. The Contractor shall deliver to the Architect all certificates of said inspections issued by the authorities having jurisdiction.

1.7 BID BASIS

A. Basis of Design: The design is based on equipment data furnished by a listed "Base" manufacturer. Only this base listed equipment has been verified by the A/E for compliance with the documents. There is no intent in these documents to necessarily use only "standard" products of the "Base" supplier nor any other supplier. Modifications and alterations of standard products may be required.

1.8 MATERIALS AND WORKMANSHIP

A. All materials and equipment shall be new and free from flaws and defects of any nature. Materials called for are to be considered as standard of quality; which however, implies no right on part of Contractor to substitute other materials and methods without written authority from Architect.

B. All work shall be performed by skilled mechanics, under competent supervision, employing latest and best practices of the trade. Work shall be installed in accordance with recommendations of ASHRAE Guide, and equipment manufacturer's installation instructions. In the event there is any conflict or doubt, consult Architect for clarification and approval.

1.9 SUBSTITUTIONS

A. Specific reference in the specifications to any article, device, product, material, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor in such cases may at his option, use any article, device, product, material, fixture, form or type of construction, which in the judgement of the Architect, expressed in writing prior to bidding as specified below, is equal to that herein named.

B. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified, shall be submitted for approval to the Architect ten days before bids are taken. Requests shall be accompanied by samples, descriptive literature, and engineering information, as necessary to fully identify and appraise the product. No increase in the contract sum will be considered when requests are not approved. If the item is found to be equal, the Architect will issue an Addendum making it a part of the Contract Documents prior to bidding. After bidding, no further changes will be considered.

C. Contractor shall be responsible for determining that all products submitted for approval meet given space limitations and maintain all required clearances for proper access and service.

D. Being listed as an approved equal manufacturer means only that the listed manufacturer is basically a reputable supplier whose equipment will receive consideration if in accordance with all document requirements including space limitations and deliver. Being listed is not to be construed as indicating or implying that the supplier's product is assured of being acceptable for the project. The burden of developing a product to comply with the documents and of obtaining approval of the product rests solely with the Contractor and is his sole responsibility to substantiate their acceptability for installation on this project. If a substituted product is rejected due there will be no increase in contract sum to provide a compliant product.

1.10 SUBMITTAL

A. The Engineer will review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be for general compliance with the design and with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Engineer's review shall be conducted with reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviation from the Contract Documents not clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been made.

B. Prior to submittal of shop drawings to the Engineer, the General Contractor and the Mechanical Contractor shall review and approve shop drawings. Shop drawings which have not been reviewed and approved in writing by the Mechanical Subcontractor will not be reviewed by the Engineer. Mechanical Contractor shall state in writing on shop drawings, any proposed deviations from contract documents. Such deviations, if not stated in shop drawing submittals, shall be the sole responsibility of the Mechanical Subcontractor. **Note: In addition to the General Contractor's approval and stamp, the first page of each shop drawing submittal must contain the words "APPROVED" or "APPROVED AS NOTED" and must be signed and dated by the Mechanical Subcontractor before the Engineer will review them.**

C. Review rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail; said review does not in any way relieve this contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

D. After award of Contract, and before any materials of this Section are delivered to the job site, submit Shop Drawings to Architect in accordance with the requirements listed below and in accordance with the provisions of the Architectural Section of these Specifications.

1. After securing tentative approval on all items pending shop drawing submission, the contractor shall submit for approval manufacturer's shop drawings of all equipment, and shop drawings to scale of all fabricated work furnished under this Section of the specifications including piping, ductwork, equipment layouts, supports and equipment foundation pad layout. Shop drawings shall be of scale large enough to clearly indicate all details of work. Mechanical rooms, boiler rooms, refrigeration plants, and fan rooms shall be submitted on a scale of not less than 1/4-inch equals one foot.
2. Where colors or finishes are specified for products, a sample showing the color or finish shall be submitted with the shop drawings.
3. Where high efficiency motors have been specified, submit certification of motor efficiency with shop drawings for each motor of one horsepower or greater.

E. Material List: Accompanying the shop drawings, submit a complete list of all materials proposed to be furnished and installed under this Section, giving manufacturer's name and catalog number, sizes, capacities, model numbers, accessories and other pertinent information for each item to indicate full compliance with drawings and specifications; this shall in no way be construed as permitting substitution except as specifically provided in the Architectural Section of these specifications. Every device or piece of equipment herein specified by model and manufacturer shall be submitted for approval. Partial lists submitted from time-to-time will not be permitted.

F. Mechanical/Electrical Coordination: Before equipment is ordered and after all motors, loads, controls, and other characteristics of equipment are known, the Contractor shall review the data shown on the Electrical drawings. Special attention shall be given to motor size, starters, means of disconnect, control wiring, etc. that are being furnished under the electrical section of the specifications. At the time of shop drawing submittal, the contractor shall by letter to the Engineer point out any discrepancies and describe the proposed corrective action.

1. Prior to start of construction, contractor shall submit a starter schedule for review by Engineers. This schedule shall contain equipment description, starter manufacturer and model number, starter accessories, control voltage and source of starter power and control circuitry.
2. No extra charge will be approved after start of construction for work resulting from failure of contractor to follow these instructions.

G. As-Built Drawings: Contractor shall maintain on the job site one complete set of the mechanical drawings for this project. All changes authorized by the Architect as to the location, sizes, etc., of piping, ductwork, and other mechanical equipment shall be indicated in red ink on the mechanical drawings as the work progresses. At the completion of the project, Contractor shall deliver a complete set of "As-Built" prints of the mechanical drawings to the Architect.

H. Control Drawings:

1. Before installation of controls, complete submittal data, including equipment specifications, control diagrams, schematic diagrams, internal connections, and sequence of operation to the Architect for his approval. Diagrams shall show all instruments, devices, tubing, etc. Set points and actions of instruments, operating ranges, and normal position of controlled devices shall be indicated. Operating sequence describing each system shall appear on the same drawing as the system's control diagram.
2. Wiring diagrams shall show conduit and wire sizes, transformers, fuses and correct schematic diagrams for each motor starter and magnetic contractor. Diagram shall be coordinated with the equipment manufacturers involved and shall show the terminal designations for all connections to the equipment and the manufacturer's approval obtained.

I. Manual: Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Owner through the Architect two copies each of a Manual compiled in accordance with the provisions of the Architectural Section of these specifications; and also include in each copy of the Manual a copy of the As-Built Drawings, operating and maintenance instructions, approved control drawings, spare parts lists, name and address of local service representatives and all warranty certificates for new equipment.

1.11 ELECTRIC WORK

A. Electrical Contractor will provide the following for the mechanical equipment:

1. A source of power as required for each electric motor and for each electrical heating and cooling item of equipment installed under the mechanical contract, including final wiring connections to motor terminals or to terminals in a control panel mounted on each respective unit.
2. Circuit breaker protection as required for each electric heating and cooling item of equipment installed under the mechanical contract.
3. Wiring each electric motor and each electrical heating and cooling item of equipment (where applicable) through a magnetic starter or a magnetic contactor furnished by the Mechanical Contractor.
4. Wiring each constant speed ceiling exhaust fan through a wall switch furnished by the Electrical contractor.

B. All motors shall be provided with thermal overload protection either internally or at the starter and all electrical equipment shall be U.L. listed.

C. In the event Mechanical Contractor proposes to use any items of mechanical equipment which have sizes, numbers of electrical meters, or other electrical requirements different from those specified on schedules, drawing or elsewhere, Contractor shall be responsible for coordinating these changes with the Electrical Contractor and he shall reimburse the Electrical Contractor for all additional costs necessitated by these changes.

D. In general, the Electrical Contractor will do all power wiring for the mechanical equipment as described above, and the Mechanical Contractor shall do all control and interlock wiring, unless otherwise specified or indicated on drawings.

E. Consult electrical drawings for extent of electrical work provided for the mechanical equipment. Verify current characteristics with Electrical Contractor before ordering any equipment for this project.

F. Mechanical Contractor shall provide all other wiring not covered above, that is necessary for complete and operating heating and air conditioning systems for the building, including all control wiring, interlock wiring, conduit, relays, controls, starters, disconnect switches, circuit breakers, control conduit and outlet boxes, wiring of all applicable control items of equipment, and other electrical work as required.

G. All wiring shall be run in galvanized or sherardized rigid electrical conduit or E.M.T. where allowed under the electrical section of the specifications and shall be concealed in finished areas and occupied spaces. All conduit shall be attached to ceiling or walls, attachment to or suspension from other equipment will not be permitted. If routing of conduit is questionable, verify routing with Engineers before proceeding with installation. NO PLENUM RATED CABLE WILL BE ALLOWED ON THIS PROJECT.

H. The Mechanical Contractor shall provide power wiring from the breaker panel to all control devices including but not limited to control panels, valves, thermostats, dampers, flow switches and other devices requiring power for a complete and operating mechanical system.

I. All electrical work required under this Contract shall comply with the National Electrical Code, and shall meet all local requirements. All electric equipment shall bear UL labels.

1.12 GUARANTEES

A. In addition to the warranty and guarantees under the General Conditions of the contract the Contractor agrees:

1. To correct defects in workmanship, new materials, new equipment, and the operation of system for a period of one year from date of acceptance. Equipment and materials repaired or replaced are guaranteed for one year following date of correction.
2. To repair any damage to building and equipment resulting from defects in workmanship, materials, equipment, and system operation.
3. To remove any item not specified or given approval and replace it with specified or approved item.
4. Any item submitted for approval that does not conform to these specifications shall have accompanying note of exception.
5. That the system as installed shall comply with code requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. All equipment and materials provided under this section of the specifications shall be new and of the best grade and quality. Materials and equipment manufactured outside of the United States will not be acceptable.

B. The approval of the Architect shall be obtained by the Contractor on all equipment and materials before any installation is made.

C. Equipment that is installed and then does not perform as represented by selection data or shop drawings shall be replaced with equipment that meets the job requirements and specifications at no additional cost to the Owner.

D. All equipment, materials, and work indicated on the drawings or as specified hereinafter is intended to be installed in a manner conforming to the best engineering practices and all equipment is intended to be complete in every respect to satisfy the job requirements and this specification. In the event any material or equipment is indicated to be used or installed contrary to the manufacturer's recommendations, or if any part, control accessory or auxiliary item required for satisfactory and proper operation and performance of the material and/or equipment is not indicated or specified, it shall be the Contractor's responsibility to notify the Architect in writing prior to installation. In the event the Contractor fails to give such notice, he will be required to correct the work and/or furnish items omitted (in the performance of his work) at no increase in the contract sum.

E. Upon request from the Architect, the Contractor shall furnish to the Architect a certification on all materials and equipment so designated by the Architect. The certification shall be made by the manufacturer of the material and/or equipment; shall be signed by an official of the manufacturing concern; and shall state that the drawings, specifications, and project requirements have been thoroughly studied by the manufacturer and that the proposed material and/or equipment is unconditionally guaranteed to operate and/or perform properly as applied.

PART 3 - EXECUTION

3.1 UTILITY CONNECTION AND MODIFICATIONS

A. It shall be the Contractor's responsibility to determine all requirements regarding utility services to the building. The Contractor shall verify the exact locations of stubs provided.

3.2 PROTECTION

A. The Contractor shall provide adequate protection to all materials, equipments, fixtures, etc. provided under this section of the specifications to prevent damage of any nature. The Contractor shall be required to remove and replace, at no additional cost to Owner, any item showing any sign of damage of any nature that cannot be restored to its new condition and appearance. Grinding and polishing may be used in the restoration of damaged equipment and materials when approved by the Architect.

3.3 EXCAVATION AND BACKFILLING

A. Contractor shall do all excavating and backfilling for installation of work included under this contract and he shall promptly remove from the premises all excess earth, debris, and trash for which he is responsible. Contractor shall be responsible for coordinating cutting and patching excavation conditions with Owner and Utilities prior to execution of any excavation work. All work shall comply with section 230500 as well as the General Conditions section of these specifications.

3.4 CUTTING AND PATCHING

A. The Contractor will do all cutting and patching and construction of chases within building for this installation.

3.5 PENETRATIONS AND CURBING

A. Contractor shall provide framed openings in roof and walls as required for exhaust fans and louvers. Contractor shall coordinate sizes and locations of these and all other necessary penetrations well in advance.

B. Contractor shall provide all roof curbs for this installation and will flash all roof curbs and penetrations as detailed on drawings.

3.6 MECHANICAL - ELECTRICAL COORDINATION

A. Mechanical equipment, piping, and ductwork shall be installed with clearances to electrical switchboards, panel boards, power panels, motor control centers, and transformers. The clearances shall be the greater of the requirements of the latest editions of the NEC or a minimum of 3'-6" in front of the equipment which ever is greater. Equipment, ductwork or piping shall not be installed directly over the electrical gear and not less than 3'-0" horizontally from the top of the electrical gear.

3.7 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Contractor shall acquaint and instruct the Owner's representative with all details of performance, operation, and maintenance of the systems. In addition, the contractor shall furnish two copies of a brochure to the Owner through the Architect, which shall contain printed operating and maintenance instructions, parts list, control diagram, etc., including a list of spare parts and any special tools recommended by the equipment manufacturers to be stocked by the Owner. The manuals shall include a complete set of all approved shop drawings furnished under this section of the specifications.

B. The basis of Owner's instructions shall be written for inclusion in the maintenance and operating instructions data specified above. Obtain certificates, signed by the Owner's representative, that these instructions have been received and understood.

3.8 CLEANING

A. The Contractor shall keep the job site clean, removing all debris and unused material as they occur. At the completion of the work, the Contractor shall thoroughly clean all materials and equipment provided as part of the work.

B. Prior to testing and adjusting, all piping systems, including all components of systems, shall be thoroughly cleaned inside and out.

C. All soil, waste, drain and rainwater lines shall be rodded out in the presence of the Architect's representative. All cleanout plugs shall be removed, lubricated and replaced.

D. All piping shall be chemically cleaned prior to final filling and connection to chiller and air handlers.

E. Painting of the mechanical equipment shall be as specified under other sections of the work. Removing loose scale, rust, drippings, dirt, etc. in preparation for painting shall be done under this section of the specifications.

F. Prior to acceptance of the building, thoroughly clean all exposed portions of the HVAC installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the item being cleaned. Caution should be taken to avoid damage to all finished surfaces.

G. Mechanical unit shall be protected from dust at all times. Mechanical units shall not be run during construction installation periods that create dust such as sheetrock finishing, cabinetry, terrazzo, etc. When mechanical units are in operation during construction, filters must be in place in the units and over the return air grilles to protect equipment and return air path from construction debris and dust. Filters shall be changed by the contractor as frequently as necessary to insure protection of equipment and ductwork. If filters are not in place equipment shall not be operated. Failure of the contractor to comply with these conditions will result in the contractor bearing any and all costs associated with cleaning of ductwork and equipment prior to final acceptance of systems.

3.9 START-UP

A. The Contractor shall provide factory start-up and place the systems in full operation before testing begins. Contractor shall make corrections in the system, including furnishing and installing drives, motors, dampers, valves, etc., if required to balance the systems. All such corrections shall be included in the Contractor's base bid and shall be accomplished at no additional cost to the Owner. All piping shall be tested before covered with insulation or being concealed.

END OF SECTION 230200

SECTION 230300 - PRESSURE TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work in this section includes the pressure testing of all air conditioning systems and includes requirements common to all the mechanical systems. Provide all labor, tools instruments, etc. as required to completely test the systems.

B. Other sections of these specifications are a part of this section. Refer to all other sections for a complete description of the work. Work, conditions, and materials specified in other sections and not duplicated in this section includes, but is not limited to the following:

1. General Requirements Mechanical.
2. Basic Materials and Methods.
3. Balancing, Adjusting, and Tests.

C. All work provided under these specifications shall be subject to constant inspection and final approval of the Architect and all Code authorities having jurisdiction. Tests, in addition to these specified herein, required to prove Code compliance shall be provided as required by the Authorities without additional cost to the Owner. All work found to be defective or indicating leakage shall be repaired or replaced with new materials, as directed by the Architect. Tests shall be repeated until all work is proven tight.

1.2 QUALITY CONTROL

A. All tests shall be conducted by qualified personnel. When requested the qualifications of individuals shall be submitted to the Architect for approval.

1.3 NOTIFICATION

A. The Architect shall be notified 5 business days prior to all tests.

B. The Code Authorities having jurisdiction shall be notified prior to all tests.

C. Provide documentation of all tests in writing for approval.

PART 2 - PRODUCTS

2.1 PROVIDING EQUIPMENT

A. Provide all material, test equipment, instruments, and labor required for the tests. All instruments shall be properly calibrated and shall have records on calibration.

PART 3 - EXECUTION

3.1 DUCTWORK

A. All ductwork shall be constructed to the following SMACNA seal, velocity, and pressure classifications:

Duct construction & classification:

Application	Presure Class	Velocity Class FPM	SMACNA Seal Class
LOW PRESSURE (RETURN / EXHAUST)	-2.00	2500	B
LOW PRESSURE (SUPPLY)	+2.00	2500	B

B. All ductwork shall be pressure tested before insulation, air distribution, and ceiling are installed. All pressure classes shall be tested with a calibrated orifice and fan.

1. Low pressure sheet metal duct losses shall not exceed 3% of the design system CFM at 2" W.G.

C. Providing pressure test does not meet the previous requirements, any repair shall be made after the test has been completed and with no pressure on the duct system. Retest of system shall be completed after the manufacturer’s required time for duct sealant to full cure.

END OF SECTION 230300

SECTION 230500 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The use of the word "PROVIDE" in the specifications and on drawings for work under this section shall mean: Furnish and install complete, supplying all necessary labor and materials.

B. This section applies to all sections of Division 23 of this project except as specified otherwise in the individual sections and here-in. Work described in this section includes general requirements common to all mechanical systems. Provisions of this section apply to all mechanical specification sections. Work described in this section includes construction materials and methods of installing equipment common to all mechanical systems. Provisions of the section apply to all Division 23 specifications sections.

C. Mechanical General Provisions apply to work specified in this section.

PART 2 - PRODUCTS AND METHODS

2.1 FLASHING

A. Ductwork and HVAC Equipment: Cap flashing for all ducts and other types of ventilating equipment which pass through or mount on the roof shall be furnished and installed under this section of the specifications. The material shall be of the same materials as the ducts, etc. to which it shall be fastened unless otherwise noted. The cap flashing shall be made tight to the duct, waterproofed, and extended over the base flashing and down the side for not less than 4 inches. The cap flashing shall be formed to provide a spring action against the base flashings. In cases of dissimilar metals between the cap and base flashings, an isolation membrane shall be installed to prevent electrolysis.

B. Flashing for pipes passing through the roof shall be provided as indicated on the drawings or as approved by the Architect.

2.2 FIRESTOPPING MATERIALS

A. Where pipe, ducts, conduit, wiring, or other mechanical equipment passes through fire rated walls, floors, or partitions with ratings of one-hour or greater, firestopping materials shall be placed in the voids between the equipment and the rated building material. Sleeves in rated construction shall have voids between sleeves and duct or pipe filled with firestopping materials.

B. Firestopping Materials shall have a fire rating equal to or greater than the construction penetrated. Firestopping material shall not produce toxic smoke when exposed to flame. Firestopping shall be unaffected by vibration, normal usage, and shall not deteriorate with time.

C. Firestopping materials shall be Chase-Foam as manufactured by Chase Technology Corp. or Silicone RTV Foam (3-6548 Silicone) as manufactured by Dow Corning or 3M "CP-25" caulk system. Where permitted by Code, fire rated mineral wool may be used for applications approved by the Architect. All fir stopping systems shall be installed in strict compliance with manufacturer's instructions for compliance with UL listings.

D. Firestopping in the mechanical room [and elevator machine room] shall be recessed 3/4-inch on both sides and shall be sealed on both sides with 3/4-inch of acoustical sealant.

2.3 PENETRATIONS AND CURBING

A. General Contractor shall provide framed openings in roof and walls as required for exhaust fans and louvers. Mechanical Contractor shall coordinate with General Contractor and provide General Contractor with sizes and locations of these and all other necessary penetrations well in advance. Failure to do so will result in Mechanical Contractor bearing cost of this phase of the work.

B. Mechanical Contractor shall provide all roof curbs for this installation and General Contractor will flash all roof curbs and penetrations as detailed on drawings.

C. Mechanical Contractor shall provide all roof equipment support rails for this installation and General Contractor will flash all support rails and penetrations as detailed on drawings.

D. Curbs shall be welded galvanized steel construction minimum 18 ga. with wood nailer, 1-1/2" rigid insulation on interior, counter flashing cap, and damper shelf as required. Unless specified elsewhere curbs shall be a minimum of 12" high with interior dimensions as required by unit dimensions. Curbs shall be Creative Metals, Inc. Series CSSF, Conn-Fab, or approved equal. Curbs shall be compatible roof system. Verify roof construction and pitch prior to ordering curbs. Provisions shall be made within curbing penetrations for routing of power wiring and control wiring to equipment to prevent the necessity of a second roof penetration for this purpose. Refer to Section 230548 for special vibration and seismic requirements of roof curbs.

E. Equipment Support Rails shall be welded galvanized steel construction minimum 18 ga. with wood nailer, 1-1/2" rigid insulation on interior, counter flashing cap, and damper shelf as required. Unless specified elsewhere curbs shall be a minimum of 12" high with interior dimensions as required by unit dimensions. Curbs shall be Creative Metals, Inc. Series ESSSF, Conn-Fab, or approved equal. Support Rails shall be compatible roof system. Verify roof construction and pitch prior to ordering rails.

F. Where walls are penetrated for louvers, ducts, or vents, appropriate lintels shall be provided to support structure and shall comply with the requirements of the structural drawings and specifications.

2.4 FLOOR, WALL AND CEILING PLATES

A. General:

1. Where exposed to view, all piping or duct passing through or into floors, walls, partitions, and ceilings shall be provided with escutcheon plates of flanges. The Plates or flanges shall fit snugly around the pipe, or the pipe insulation for insulated lines, and shall cover completely the pipe opening and sleeves. Plates shall be fabricated of minimum 16 gauge galvanneal as appropriate to allow field painting. All plates shall be painted to match surrounding finish.

B. Unfinished Areas:

1. In unfinished areas, the plates or flanges shall be constructed of not less than 16 gauge galvanized sheet metal. Equipment rooms with furred ceilings will be considered as unfinished areas.

2.5 ACCESS PANELS

A. Access panels shall be provided for access to all equipment, valves, piping, dampers, etc. furnished under this section of the specifications and requiring access. Dampers with operating control through the ceiling will not require access. The panels shall be located as indicated on the drawings and/or as required for adequate access. The exact locations of the access panels shall be as approved by the Architect.

B. Walls and Ceilings: Furnish and install steel doors in sidewalls, in walls of chases, in inaccessible ceiling, and other locations as indicated or required for ready access to service valves, balancing valves, automatic air vents, balancing dampers, and other items as applicable. Access doors shall be a minimum of 24" x 24" in size where applicable, and shall be furnished with screwdriver operated cam lock doors and a gray prime coat finish. Access doors shall have the same fire rating as the walls, floors, or ceilings in which they are installed. Access doors shall be Miami-Carey Co. Model HP and (as applicable) or approved equal.

C. All panels located in fire rated walls or partitions shall be 1-1/2 hour B rated doors.

D. Ductwork: Furnish and install steel access doors where indicated and/or required for access to motor operated dampers, controls, filters, louvers, fire dampers, and any other operable devices. Access doors shall be minimum 18" x 18" in size and shall be fabricated of minimum 24 gauge galvanized steel hinged to a fastening device to give an air tight closure on neoprene or felt gasket. Doors for insulated duct shall be double panel construction with 1" rigid insulation material between metal panels. Access doors shall be Ruskin AD-1275, Series ADH-22 or approved equal.

E. Suppliers of Comparable Products: Krueger, Miami-Carey, Ruskin.

2.6 PAINTING AND LABELLING

A. All factory applied finishes on equipment and materials that are damaged in any fashion shall be restored to their original finish in a manner as approved by the Architect.

B. Where the Interior of any duct is exposed to view or can reflect light as viewed from a habitable space the interior surfaces shall be primed and painted flat black or as otherwise approved by the Architect.

C. Where colors or finishes are specified in this section of the specifications to match adjacent surfaces and the colors or finishes of the product installed do not match the contractor shall repaint or refinish as required to accomplish the desired effect, as approved by the Architect.

D. All finish painting shall be performed under another section of the specification, except as specified otherwise in this section of the specification.

E. Mechanical Contractor shall paint all exposed piping, both insulated and uninsulated that is installed under his contract. Refer to Architectural Section and piping specifications for painting specifications.

F. Paint and label all piping or insulation around piping according to existing color scheme. If no existing color scheme exists, use standard colors as indicated in Chapter 39 (PIPING SYSTEM IDENTIFICATION) of 2021 ASHRAE FUNDEMENTALS. Submit proposed colors and markings to A/E for approval.

G. Engraved plastic nameplates shall be provided for each piece of equipment installed on this project. Lettering shall not be less than one-quarter inch high. Mechanically fasten nameplates to fixed surface on equipment or on walls immediately adjacent to each piece of equipment. Label all equipment with tag indicated on mechanical schedules and details, i.e., HP-1, AHU-1, CP-1, etc. in addition to this minimum information, where a piece of equipment is dedicated to and individual room or area, the device label shall include the area designation/room number. Prior to fabricating labels, contractor shall obtain room/area designations from Engineers for compliance with final building signage. Refer to Sections 230503, 232300, 233000, and 230900 for additional labeling requirement for system components.

2.7 OUTDOOR UNIT SUPPORTS

A. Units on grade: Mechanical Contractor shall provide a reinforced concrete pad for each outdoor unit located on grade. Concrete shall be reinforced with No. 4 rods twelve (12) inches on center. Pad shall extend six (6) inches beyond the edge of the unit. The top of the pad shall be a minimum of four (4) inches above finished grade.

B. Units on roof: Mechanical Contractor shall provide equipment support rails for each outdoor unit located on roof. Equipment support rail shall be as specified here-in. Mechanical Contractor shall coordinate with General Contractor on support rail placement to insure proper support and installation.

2.8 STRUCTURAL ATTACHMENTS

A. Concrete fasteners shall be self-drilling type, Locke Mfg. Co. "Bull Dog", Phillips "Red Head", or Diamond "Blue-Cut".

B. Mechanical Contractor shall provide all supplementary steel, framing members, beam clamps, hanger rods, etc., as required to properly support equipment and ductwork.

C. Hanger rods shall be selected to safely carry the load to be supported and shall not be less than the diameter listed by the hanger manufacturers for the specific size hanger used.

D. Attachment:

1. Piping and equipment suspended from steel construction shall be suspended from beams from the panel points of the bar joist only. When the hanger point is not directly below a structural member of a joist panel point, supplementary supporting steel shall be provided to receive the bridge across the structural member of a joist as required to receive the hanger. The hangers and supporting steel shall not be attached to the roof deck construction.
2. Hangers and supporting steel shall be attached to new concrete construction with continuous metal inserts designed to be used in ceilings, walls, or floors. In no case shall the load imposed on an insert exceed the manufacturer's recommended loading.
3. Hangers and supporting steel shall be attached to existing concrete structure, using concrete drill anchors at location and in a manner as approved by the Architect. Anchors shall not be loaded beyond their published ratings.

E. Support ducts from building structure with galvanized steel hangers to each side of duct. Hangers for ducts up to 60 inches maximum side dimension shall be 1" X 1/8" galvanized steel band. Hangers for larger ducts shall be 1-3/8" X 1/8" galvanized steel band. Space hangers on 8 foot centers with three hangers at each branch or take-off.

F. Steel pipe passing through a concrete slab on grade shall have modular expanding seals between pipe and sleeve. "Link-Seal" or an approved equal.

2.9 FOUNDATIONS, HANGERS, AND SUPPORTS

A. The Contractor shall provide all necessary hangers, supports, bracing, accessories, etc. required for proper installation of the work. Pipe hangers shall be spaced close enough to maintain proper grade and prevent sagging, but in no case shall the hanger spacing be greater than specified hereinafter. Special care shall be taken in supporting piping subject to expansion and contraction so that the piping does not become improperly aligned or anchored.

B. Unless specifically indicated otherwise, all concrete foundations and all structural steel, other than the building structure or special supports provided under another section of the specifications, required for proper support of piping, equipment, and materials provided under this section of the specifications and shall be furnished and installed under this section of the specifications and shall comply in strict accordance with all requirements of the Structural and/or Concrete Sections.

C. All supplementary steel exposed to the weather shall be hot-dipped galvanized.

D. Unless otherwise indicated, all floor mounted equipment located in the Equipment Room and spaces shall be mounted on 4" high concrete bases extending 6" beyond the bases of the equipment in each direction. Concrete shall be reinforced with No. 4 steel rods spaced 12" on center in both directions, except that steel in pump bases shall be on 6" centers.

2.10 ELECTRICAL

A. All motors required for all equipment furnished under this section of the specifications shall be provided under this section of the work. Two speed motors shall be two winding type unless otherwise indicated. Unless otherwise indicated under the Electrical work or on the Mechanical Drawing, motors smaller than 1/2 HP shall be for 115 volts, single phase, 60 cycle power, and motors 1/2 HP and larger shall be single or three phase 60 cycle power as indicated on equipment schedules.

B. All motor starters, both manual and magnetic, and pushbutton stations required for motors furnished under this section of the specifications shall be provided under this section of the work unless specifically noted or indicated or otherwise in the Electrical section. All starters shall have "HAND-OFF-ON" switches and auxiliary contactors. Control transformers shall be provided as needed to meet control requirements. All two-speed starters shall be for two winding motors and shall have decelerating relay between high speed and low speed. All starters shall have compelling low speed start relay. All starters shall be installed under the Electrical Section of the specifications, unless furnished as an integral part of the equipment. All starters shall be of the same manufacturer as the starters furnished under the Electrical Section, except starters for water chillers may be of a different manufacturer. Coordinate with the Electrical Section.

C. Motors one horsepower and larger, including those used for pumps, air units, fans, etc. shall be designed in accordance with NEMA Standard MGI, Design B, Class B or F insulation for 40 degrees C temperature rise. The motor power factor at full load and rated voltage for motors with greater than 1 HP output shall be at least 0.85 Power factor shall be as determined by IEEE Standard 112A Method B. Apparent efficiency shall meet AHRAE 90 minimum standards

D. All power wiring shall be provided under the Electrical Section of the specifications, unless specifically noted otherwise in this section of the work. Power wiring between starters and applied equipment motors shall be provided under the Electrical Section. Power wiring that is furnished under the Electrical Section to Packaged Equipment such as rooftop units, condensing units, electric heating equipment, packaged house pumping systems, etc. shall consist of a single point connection and shall terminate with the connection to the units. Single point power connection shall be furnished as part of the package or shall be furnished under the Mechanical Section of the work.

E. All electrical devices and equipment including, but not limited to, all motors, starters, relays, pushbuttons, wiring, etc. provided under this section of the work shall comply in all respects with all requirements of the Electrical Section of the Specifications.

F. Identification labels shall be provided for each starter, control device, etc. showing the instruments function. Labels shall be in accordance with the requirements for labels as specified under the Electrical Section of the specifications.

G. All control wiring shall be provided under this section of the work, unless specifically indicated otherwise under the Electrical Section of the specifications.

H. Each manufacturer shall certify in writing to the Engineer that the equipment furnished has high efficiency motors as specified hereinbefore. The certification shall state motor HP, motor manufacturer, power factor and efficiency.

END OF SECTION 230500

SECTION 230593 - BALANCING, ADJUSTING, AND TESTS

PART 1 - GENERAL

1.1 SCOPE

A. Work in this section includes the adjusting and balancing of all heating, air conditioning, and ventilating and hydronic systems. The results of all tests, adjustments, and balancing shall be submitted to the Architect for approval.

B. Provide all labor, supervision, tools, equipment, instruments, additional materials, report forms, etc. as required to complete an accurate balance of the system.

C. Belts, drives, impellers, and motors shall be adjusted and/or changed as required to obtain the required air and water quantities against the developed system pressure.

D. The building air distribution is to be balanced to provide the quantity of air as shown on drawings. System air balance is to be accompanied with certified test forms as to obtained air quantities. Proper fan performance and coil discharge air temperature reading shall also be certified on test forms.

E. Mechanical Contractor shall furnish competent personnel and necessary testing instruments and equipment to check, test, operate, and adjust all mechanical equipment and systems as installed. Tests shall be as required to ensure that all equipment is operating in accordance with manufacturer's recommendations, and requirements of this specification. Tests shall be of sufficient duration to prove adequacy and satisfactory performances of all items of equipment.

F. Mechanical contractor shall supply upon request without additional charge, instrumentation and personnel to spot check system balance in presence of Engineers and Owner.

G. All tests, balancing, and adjusting shall be performed as many times as required to prove project requirements have been met.

H. Control Contractor shall adjust and set all thermostats, program clock, and other control items of equipment as required. Contractor shall submit to the Architect and Engineers record copies of Control Contractor's certification that all specified control items of equipment have been installed, calibrated, and are operating properly.

1.2 QUALITY CONTROL

A. All testing and balancing work shall be performed in complete accordance with AABC or NEBB Standards for Field Measurements and Instrumentation, by an Engineer approved independent balance and test firm.

B. All work shall be under the direct supervision of a professional who is qualified for testing and balancing the hydronic and air performance of heating, air conditioning, and ventilation systems and has a minimum of five years experience in the field.

C. Testing and balancing instruments shall have been calibrated within a period of six months prior to use in this work. The instruments used shall be of high quality and as recommended by AABC or NEBB for the particular application.

1.3 SUBMITTALS

A. Before starting field work, submit for approval forms, data sheets, a list of instruments and procedures. Field test data report forms are to be those of the certifying body (NEBB or AABC).

B. Prior to acceptance of the system by the Owner, submit for approval a written report. The reports shall be complete showing all quantities, velocities, pressure drops, and sizes.

PART 2 - PRODUCTS

2.1 Provide all materials, test equipment and instruments required for the tests.

2.2 Belts, drives, impellers and motors shall be as specified in other sections of this specification for the equipment being adjusted.

PART 3 - EXECUTION

3.1 ADJUSTMENTS

A. Mechanical systems are intended to operate without objectionable noise and vibration. Make all reasonable adjustments to the installed materials and equipment to remove abnormal noise and vibration. Report, in writing, any condition that such adjustments do not correct.

B. Three sets of filters shall be provided. One set shall be installed for operation during construction and testing. The second set of filters shall be installed at time of final inspection and the third set of air filters shall be delivered to Owner prior to final acceptance of the project.

3.2 TESTING AND BALANCING

A. Balance and test Contractor shall provide personnel and instrumentation to adjust, balance, record, and submit not less than two test results (including final test) for each of the following:

1. Air Handling / Packaged Units

a. Total CFM readings

b. Return Air CFM readings

c. Outside Air CFM readings

d. Total Static Pressure

e. Fan Suction Pressure

f. Fan Discharge Pressure

g. Motor Amperage and Voltage

h. Fan RPM

i. Outside Air Entering temperature db/wb

j. Return Air Entering temperature db/wb

k. DX coil entering Air Temperature db/wb

l. DX coil leaving Air Temperature db/wb

2. Exhaust Fans

a. Motor Amperage and Voltage

b. Fan RPM

c. Static Pressure

d. Final CFM

e. CFM at each Exhaust Grille

3. Adjust and record air quantities for all air distribution equipment in accordance with CFM's specified on drawings.

4. Check and record return and discharge air temperature from all refrigeration equipment.

B. Submit record copies of all testing and balancing reports to the Architect and Engineers.

C. Test results shall be presented on approved Certifying Agents Report Forms. Submit these reports to the Engineer for approval prior to final building acceptance.

END OF SECTION 230593

SECTION 230700 - INSULATION OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Trained personnel regularly engaged in the installation of insulation and approved by the insulation manufacturer shall install the insulation in a neat and professional manner.

B. Except where specifically specified otherwise, all insulation, adhesives, coverings and coatings shall be applied in strict accordance with its respective manufacturer's recommendations.

C. No wheat paste or organic materials that breed or sustain mold shall be used in conjunction with the insulation work.

D. The Contractor shall verify that all tests and inspections of the work to be insulated have been completed and approved before the insulation is applied.

E. Adequate provisions shall be made to protect the premises, equipment, and the work of other trades against all droppings, adhesives and coatings used in the installation.

F. Pipe unions, strainers and flanges on hot lines shall not be insulated; starting and stopping points for the insulation on hot lines shall be 1 inch on either side and shall be neatly tapered and tightly sealed. Cold lines subject to sweating shall be insulated throughout, including unions, flanges and strainers.

G. Ample provisions shall be made at hanger and support points to prevent the compression of insulation beyond that recommended by the insulation manufacturer for the application.

H. All insulation shall have a composite insulation, jacket, binders, and adhesives fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255, and UL 723, not exceeding the following values and shall be so listed by UL:

Flame Spread 25
Smoke Developed 50

I. All accessories, including but not limited to, adhesives, mastics, tapes, shall have the same component ratings. All materials shall be labeled indicating compliance with the above requirements. All treatments used to obtain the required ratings shall be permanent; water-soluble treatments will not be acceptable. Flexible elastomeric insulation with smoke developed exceeding 50 is prohibited in ceiling plenums, return air plenums, or ductwork.

1.2 SUBMITTALS

A. Submit shop drawings and data to prove complete compliance with these specifications on all products and methods of installation.

1.3 SCOPE

A. Includes but not limited to insulation of the following items:

1. All supply, return, and outside air ductwork inside the building. (fiberglass)
2. All exposed supply, return, and outside air ductwork. (polystyrene)
3. Condensate drain lines. (Armaflex)

1.4 QUALIFICATIONS

A. All insulation shall be installed in a workmanlike manner by qualified insulation mechanics. Install all insulation in strict accordance with the manufacturer's recommendations, using approved type laggings, adhesives, mastics, and other materials as applicable.

PART 2 - PRODUCTS

2.1 DUCTWORK INSULATION

A. Insulate all supply, return, and outside air ducts inside of building with 2-1/4" thick (¾ lb/ft3 density) fiberglass duct insulation Ultralite, or equal. Insulation shall have .29 maximum K factor (BTU-in.)/(h-ft3-°F) at 75°F mean temperature and shall be supplied with reinforced foil-faced vapor barrier. Insulation as installed shall meet the minimum requirements of the current edition of the International Energy Conservation Code.

B. Unexposed low pressure sheet metal supply, return, and exhaust duct shall be internally lined for 10 feet from the unit to reduce sound and prevent any possibility of sweating. Internal duct liner shall be 1" thick duct liner equal to "Manville Linacoustic" with Permacote anti-microbial coating.

C. Exposed low pressure sheet metal supply, return, and exhaust duct shall be internally lined throughout its entire length to reduce sound and prevent any possibility of sweating. Internal duct liner shall be 1" thick duct liner equal to "Manville Linacoustic" with Permacote anti-microbial coating.

D. Insulate all exterior ductwork with 2" thick rigid polystrene insulation and provide a 0.032 aluminum weatherproof enclosure.

E. Insulate all grease ductwork with two layers of 3M Fire Barrier Duct Wrap 615+ for 0 inches to combustibles and one hour rating.

2.2 AIR CONDITIONING CONDENSATE DRAIN LINES

A. Insulate condensate lines with 3/4" foamed rubber pipe insulation. Foam rubber insulation shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as tested by ASTM E 84-75. Seal all seams and joints with adhesive equal to Armstrong 520.

B. Insulation shall be Armaflex "AP", or equal product by Rubatex, or Manville

PART 3 - EXECUTION

3.1 GENERAL

A. Install all insulation in strict accordance with the manufacturer's recommendations, using approved type laggings, adhesives, mastics, and other materials as applicable

3.2 INSULATION OF SHEETMETAL DUCTWORK

A. Interior sheet metal supply, return and outside air duct shall be internally lined for a minimum of ten feet from the origin to reduce sound and prevent any possibility of sweating. The liner shall be secured to duct with 1" fasteners and additionally secured to duct with a coating of duct liner adhesive. Secure to duct with stic-clips, overlap all seams and joints and staple. All seams and joints and punctures in vapor barrier shall be sealed with waterproof mastic.

B. Insulate all supply, return, and outside air ducts inside of building including lined ductwork with 2-1/4" thick duct wrap.

1. Install duct wrap in accordance with manufacturer's recommendations.
2. Do not compress insulation except in areas of structural interference.
3. Secure to duct with stic-clips, overlap all seams and joints and staple. All seams, joints, and punctures in vapor barrier shall be sealed with waterproof mastic.
4. The insulation shall be installed with all joints tightly butted or lapped and with the foil vapor barrier lapped at least 2" and taped with glass fabric tape and vapor barrier mastic. Duct tape is not acceptable.
5. The insulation shall be held in place with No. 18 gauge stainless steel wire not greater than 12" on centers.
6. Welded pins shall be used on the bottom and sides of ducts as required to prevent sagging of insulation, but in no case greater than 12" on centers.
7. The insulation shall be applied to the duct in a manner so that standing seams, bracing, etc. will not be exposed.
8. After the insulation is installed, all punctures in the vapor barrier shall be patched with glass fabric and mastic.
9. Return air ductwork need not be lapped nor sealed with vapor barrier adhesive but shall be tightly butted.
10. Repair of minor punctures in return air vapor barrier is not required.

3.3 EXTERIOR EXPOSED DUCTWORK

A. Exterior ductwork shall be insulated with 2" thick rigid polystrene insulation.

1. Install insulation in accordance with manufacturer's recommendations.
2. After insulating is complete, an exterior sleeve shall be provided to encase exposed insulation. Exterior sleeve shall be constructed of [galvanneal or paint-grip galvanized steel of no less than 18 gauge] [0.032” aluminum]. All seams and joints in exterior sleeve shall be sealed with an aluminum silicone sealant. Where sleeve attaches to building and unit the seal shall be caulked with a high quality urethane caulk.

3. After installation and inspection of exterior sleeve, the sleeve shall be primed and painted and identified with a color selected by the Architect.

3.4 CONDENSATE DRAIN LINES

A. Seal all seams and joints with adhesive.

B. Where possible, slip insulation on piping without splitting.

END OF SECTION 230700

SECTION 230900 - CONTROLS

PART 1 - GENERAL

1.1 SCOPE

A. Provide all control, interlock and starting circuit wiring. Wiring shall be 120 volts or less. Provide transformers and relays as required to comply with this requirement. Conduit shall be steel conforming to the requirements of the Electrical Specifications, except as otherwise specified.

B. Install all room thermostats and fan switches 5' AFF unless otherwise specified on plans. All room thermostats are programmable, auto changeover type and shall be furnished by unit manufacturer and wired in accordance with equipment manufacturers' recommendations for proper unit control.

C. Room instruments shall be provided with tamper-proof covers with key locks. Tamper-proof covers shall be solid base metal guards. Submit samples of thermostat guards to the Architect for approval prior to installation. All control wiring shall conform to Electrical Section of these specifications, National Electrical Code, and unit manufacturer's recommendations.

1.2 SUBMITTALS

A. Before installation of controls, submit six copies of complete submittal data, including equipment specifications, control diagrams, schematic diagrams, internal connections, and sequence of operation to the Architect for his approval. Diagrams shall show all instruments, devices, tubing, etc. Set points and actions of instruments, operating ranges, and normal position of controlled devices shall be indicated. Operating sequence describing each system shall appear on the same drawing as the system's control diagram.

B. Wiring diagram shall show conduit and wire sizes, transformers, fuses, and correct schematic diagrams for each motor starter and magnetic contactor. Diagram shall be coordinated with the equipment manufacturers involved and shall show the terminal designations for all connections to the equipment and the manufacturer's approval obtained.

PART 2 – PRODUCTS

2.1 SPLIT SYSTEMS

A. Thermostatic controls shall be programmable, automatic changeover type, dehumidification control, Wi-Fi capable, and shall be wired in accordance with unit manufacturers' recommendations for proper unit operation.

2.2 EXHAUST FANS

A. Exhaust fans shall be controlled as noted on schedules.

PART 3 - EXECUTION

3.1 INSTALL ALL ROOM THERMOSTATS and fan switches 5' AFF unless otherwise specified on plans. All room thermostats shall be furnished by unit manufacturer and wired in accordance with equipment manufacturers' recommendations for proper unit control. All control wiring shall conform to Electrical Section of these specifications, National Electrical Code, and unit manufacturer's recommendations.

3.2 LOW VOLTAGE WIRING (24 volt or less) run in partitions or above ceiling shall be run in EMT or armored cable. Provide a spare wire in each run of armored cable. Control wring shall not run in conduit with power wiring.

3.3 HIGH VOLTAGE WIRING shall be run in EMT.

3.4 ALL CONDUIT shall be concealed and attached to ceiling or walls, attachment to or suspension from other equipment will not be permitted. If routing of conduit is questionable, verify routing with Engineers before proceeding with installation.

3.5 A COPY of the complete reviewed control diagram shall be framed under glass in each Mechanical Equipment Room. Copies shall be black line photostat.

3.6 ENGRAVED PLASTIC NAMEPLATES shall be provided for all control equipment. Lettering shall not be less than one-quarter inch high. Mechanically fasten nameplates to fixed surface adjacent to each instrument gluing of nameplates to surfaces is not acceptable. Label all devices on monitoring panel and room instruments. Label shall indicate device's operating range, normal setting (or reading), and function of device.

3.7 ALL CONTROLS mounted outside building shall have weatherproof enclosures.

END OF SECTION 230900

SECTION 233000 - AIR DISTRIBUTION

PART 2 - PRODUCTS

2.1 SUPPLY DIFFUSERS AND RETURN GRILLES

A. Material and Finishes: Construct diffusers, registers, and grilles of aluminum as indicated on drawing schedules. No steel construction will be allowed on this project. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Diffusers and grilles located in fire rated ceilings shall be steel construction. Colors shall be as specified on schedules or as approved by Owner.

B. Some ceilings within building are part of a UL rated ceiling assembly. In these ceilings, only steel construction diffusers will be allowed. Each of the diffusers installed in a rated ceiling shall be provided with a ceiling radiation damper as specified elsewhere in this specification.

C. Sound Pressure Level: The inlets and outlets shall be sound rated and certified in accordance with ADC 1062 R4, in db of noise criterion (NC) based on sound power level minus 10 db in each octave band. All devices shall have a sound power level no greater than 35.

D. Throw: Defined as distance from the diffuser, register, or grille to the point which the air velocity falls below 50 feet per minute. Throw shall not exceed 1.5 times the outlet mounting height.

E. Drop: Maximum drop of air stream shall not be so great that it is within 6 feet of the floor at the end of the throw.

F. Ceiling Diffusers: Equip with baffles or other devices required to provide proper air distribution patterns indicated on drawings. Provide factory-fabricated, single key, volume dampers. Diffuser internal parts shall be removable through the diffuser-neck for access to the duct and without the use of special tools.

G. Air distribution devices shall be by Price, Titus, Metal Aire, Nailor as indicated on grille and diffuser schedule or approved equals.

2.2 DUCTWORK

A. Duct to be airtight, smooth on inside and neatly finished on the outside. Details on construction and materials not specified herein shall be in accordance with recommendations of latest ASHRAE Guide, or Duct Manual published by the Sheet Metal and Air Conditioning Contractors National Association and shall comply to the International Mechanical Code.

B. Drawings show general arrangement of ducts, but do not necessarily show all offsets, etc., required to avoid interferences. Where shape of duct is varied, alter dimensions to provide equal static pressure drop per unit of length.

C. Turning vanes must be installed in all square elbows. Radius elbows are to have a centerline radius of 2-1/2 diameters for round duct. Radius elbows in rectangular duct are to have a centerline radius of two duct widths.

D. Provide splitter dampers for adjustment of distribution to branches where indicated on drawings and elsewhere as required to properly balance system. Splitters shall be the same thickness galvanized steel as duct where used but in no case shall the splitter by less than 22 gauge. Splitter shall be hinged at leaving edge and shall have a rounded nose at air entering edge. Length of splitter shall be at least 1-1/2 times the width of smaller branch duct but in no case less than 12". Splitter shall have a 3/8" steel rod hinged to air entering edge and passing through a suitable clamp on the side of duct to permit position adjustment and rigid anchor in final position. Where size of splitter dictates multiple anchors shall be used.

E. Provide duct air extractors (DAE) for adjustment of distribution to branches where indicated on drawings and elsewhere as required to properly balance system. Extractors shall be equal to MetalAire Model 101 or 102 Airtrol. Extractor shall have a remote operator passing through a suitable clamp on the side of duct to permit position adjustment and rigid anchor in final position.

F. Except as specified, all rectangular ductwork shall be galvanized steel fabricated in accordance with latest SMACNA Duct Manual for low pressure ductwork.

G. All exposed ductwork shall be constructed of "paint grip" or galvanneal steel and shall be field painted to match ceiling structure.

H. Round flexible duct runouts to diffusers shall be Flexmaster Type 8M acoustical low pressure, flexible duct with galvanized steel helix core, CPE inside liner, 1" insulation minium R-6, and fire retardant reinforced aluminum vapor barrier jacket (.05 perm per ASTM E96), minimum working pressure 6.0” w.g. positive and -4.0” w.g. negative, or approved equal by Thermaflex. Flexible duct length shall not exceed 8'. Take off connections from rectangular ducts to flexible round ducts shall be made with Flexmaster Type FLDE spin-in fittings with extractor and damper or approved equal.

I. All ductwork shall be tested within the project. Refer to Pressure Testing Specifications 230300.

J. All ductwork shall be constructed to the following SMACNA seal, velocity, and pressure classifications:

Duct construction & classification:

Application	Presure Class	Velocity Class FPM	SMACNA Seal Class
LOW PRESSURE (RETURN / EXHAUST)	-2.0	2500	B
LOW PRESSURE (SUPPLY)	+2.0	2500	B

2.3 CEILING AND CABINET EXHAUST FANS

A. Furnish and install exhaust fans where shown on plans. Fan housing shall be heavy gauge galvanized steel and interior shall be lined with a minimum of 1/2" thick insulation for sound attenuation. Fan motor shall be vibration isolated and shall have a terminal box for single point power connection. Fan shall be furnished complete with integral backdraft, inlet grille, roof curb, and roof cap or wall cap. Roof cap shall be designed for curb mounting on roof systems. Verify roof type prior to ordering fan curbs. Fan performance shall be AMCA certified. Curb shall be pre-fabricated roof curb meeting the requirements of section 15050.

B. Wire each exhaust fan parallel to light switch in area served by exhaust fan.

C. Exhaust fans shall be Greenheck model specified, Cook, Twin City or approved equal.

2.4 AIR FILTERS

A. Furnish and install three sets of filters for each air handler as provided under the Balancing and Testing portion of these specifications.

B. Pre-filter shall be UL listed Class 2, filter media shall have an average efficiency of MERV 8 90% when tested in accordance with ASHRAE Test Standard 52-68.

C. Filters shall be Cam-Farr, American Air Filter, Continental Filter, or approved equals.

2.5 MANUAL DAMPERS

A. Volume control dampers in ductwork shall be Ruskin No. MD-35, or equal opposed blade type, galvanized steel, with heavy-duty locking quadrant. Equal products by National Controlled Air, Pottorff, Louvers and Dampers, Inc., Safe-Aire, Air Balance, Inc., Nailor or approved equals.

2.6 ACCESS DOORS:

A. Furnish and install galvanized steel access doors where indicated and/or required for access to motor operated dampers, controls, filters, louvers, fire dampers and any other operable devices. Access doors shall be minimum 18" x 18" in size or equivalent area if duct sizes do not allow for 18”x18”. Access doors shall be fabricated of minimum 24 gauge galvanized steel with a mounting frame of equal or greater gauge and provided with a cam latch fastening device to give an airtight closure on neoprene or foam gasket. Doors for insulated duct shall be double panel construction with 1" rigid insulation material between metal panels. Access doors shall be Ruskin ADC-24 or approved equal.

2.7 ROOF CURBS

A. Curbs shall be welded galvanized steel construction minimum 18 gauge with wooden nailer and counter flashing cap. All welds shall be brushed , cleaned and painted to prevent rust. Curbs shall be internally lined with a minimum of 1-1/2" thick 3 lb. density rigid fiberglass insulation. Unless specified elsewhere curbs shall be 18" high with interior dimensions as required for unit dimensions. Curbs shall be compatible with built-up Conn-Fab, or approved equal.

B. General Contractor will flash all roof curbs and penetrations as detailed on drawings.

2.8 CONTROL DAMPERS

A. Furnish and install opposed blade type airfoil control dampers of size indicated on drawings. Dampers frame shall be constructed of minimum 16 gauge galvanized steel with blade and jamb seals. Airfoil blades shall be aluminum construction. Blade seals shall be vinyl and jamb seals shall be flexible metal. All seals shall be mechanically fastened to damper, glued in place foal rubber seals are not acceptable. Damper leakage shall be less than 6 cfm/sq. ft. of damper area at 1" w.g. when tested in accordance with AMCA standard 500.

B. Dampers shall be Ruskin model specified on drawings, Pottorff, Louvers and Dampers, Inc., Safe-Aire, Air Balance, Inc., Nailor or approved equals.

C. Damper actuators shall be electric type furnished by damper manufacturer.

END OF SECTION 233000

SECTION 238143 - AIR TO AIR HEAT PUMPS

PART 1 - GENERAL

1.1 SCOPE

A. Supply where shown on drawings, split system heat pumps and associated condensing units of size and type specified. Units shall be provided with associated ductwork, supply and return grilles, and thermostats as indicated for each area of the building. Provide ductless heat pumps together with all necessary thermostats for each unit as specified and indicated on drawings.

PART 2 - PRODUCTS

2.1 ALL EQUIPMENT

A. All electrical equipment shall be UL listed.

2.2 SINGLE PACKAGE ROOFTOP HEATPUMPS

A. Furnish and install single package roof top heat pumps of model and capacity shown on drawings. Units shall be furnished complete with all controls and accessories as specified and required for complete and operating systems. Each unit shall be completely factory assembled and tested and shall include hermetic type compressor with crankcase heater, indoor and outdoor coils, fans and motors, interconnecting wiring, prewired control panel, defrost cycle, filters, relief dampers, supplemental electric resistance heaters, and indoor and outdoor thermostats. Compressor motor shall be covered by a five-year protection plan. Units shall be UL listed.

B. Protective devices shall include: high and low refrigerant pressure switch, suction line accumulator and pressure relief device, automatic defrosting cycle, thermal and current sensitive overload protection for compressor and supplemental electric heaters, rapid recycling protection for compressor, and liquid line filter-driers.

C. Outside air section shall be shipped fully factory assembled and installed in unit. The package shall be complete with necessary dampers and linkage to provide 0-100% outside air for economizer operation. Provide with reference enthalpy controls.

D. Thermostats shall be automatic changeover type supplied by unit manufacturer with supplementary electric heat lockout, fan switch, compressor short cycle protection, emergency heat switch, and reheat control. Wire thermostats for control sequence recommended by unit manufacturer.

E. Each air handler is to be supplied with a modulating hot gas reheat (HGRH) humidity control system allows for full independent control of latent capacity via a staged or modulating refrigeration system and independent control of discharge air temperature via a modulating hot gas reheat valve. The modulating reheat feature maintains a stable neutral leaving air temperature, resulting in less cycling. The system includes both relative humidity and dew point control.

F. Units shall be Trane Models specified on drawings, York, or approved equals.

2.3 FILTERS

A. Furnish and install three sets of filters for each air handler as provided under the Balancing and Testing portion of these specifications.

B. Filter shall be UL listed Class 2, filter media shall have an average efficiency of 30-35% when tested in accordance with ASHRAE Test Standard 52-68.

C. Filters shall be Farr 30/30, American Air Filter, Continental Filter, or approved equals. Three sets of filters shall be provided. One set shall be installed for operation during construction and testing. The second set of filters shall be installed at time of final inspection and the third set of air filters shall be delivered to Owner prior to final acceptance of the project.

PART 3 - EXECUTION

3.1 OUTDOOR UNIT SUPPORT

A. Units on grade: Contractor shall locate and size a concrete pad for each unit located on grade. Contractor will furnish and install concrete pads. Outdoor units shall be located where indicated on drawings. Minor adjustments to exact location shall be coordinated with Owner's Representative and Architect.

B. Units on roof:

1. Equipment support rails shall be as specified in Section 230500 and exact placement shall be coordinated with General Contractor to insure proper support and installation. Where equipment rails are mounted on pitched roofs, the equipment rails shall be fabricated to match roof pitch and provide a level platform for mounting equipment. Verify roof pitch with General Contractor and structural shop drawings prior to shop drawing submittal and prior to release of equipment orders.
2. Roof curbs shall be as specified in Section 230500 and exact placement shall be coordinated with General Contractor to insure proper support and installation. Contractor to verify all roof pitches prior to fabrication to match roof pitch and provide a level platform for mounting equipment. Shims are not allowed for leveling roof curbs. Verify roof pitch with General Contractor and structural shop drawings prior to shop drawing submittal and prior to release of equipment orders.

3.2 INDOOR UNIT SUPPORTS AND VIBRATION ISOLATORS

A. Mechanical Contractor shall furnish and install neoprene-in-shear type vibration isolators for all indoor units. Isolator shall be Vibration Mountings and Controls, Inc. Type "R" or "RD" for floor mounted units and Type "RH" or "RHD" for suspended units, or equal by Mason Industries, Inc. Korfund, or Amber Booth. Isolators shall be sized and installed according to manufacturers recommendations for load and deflection. Mechanical Contractor shall furnish and install all supplementary steel, framing members, beam clamps, hanger rods, etc. as required to properly support units.

B. Each floor mounted unit shall be provided with a 3-1/2" concrete house keeping pad. Dimension of house keeping pad shall be a minimum of 3" larger than equipment footprint in all directions.

3.3 SPLIT SYSTEM REHEAT MODULE

A. Refer to reheat module manufacturer's installation instructions for required accessories, piping modifications, and control connections. Contractor must provide all components for a complete operating system.

3.4 CONDENSATE DRAINS

A. Provide a trapped copper condensate line from each indoor unit to location indicated on drawings. Where routing of condensate line is not indicated on drawings or where no termination point is indicated for the condensate line, the contractor shall route the line from each indoor unit to the exterior of the building and terminate 6" above finished grade in a landscaped area.

END OF SECTION 238143