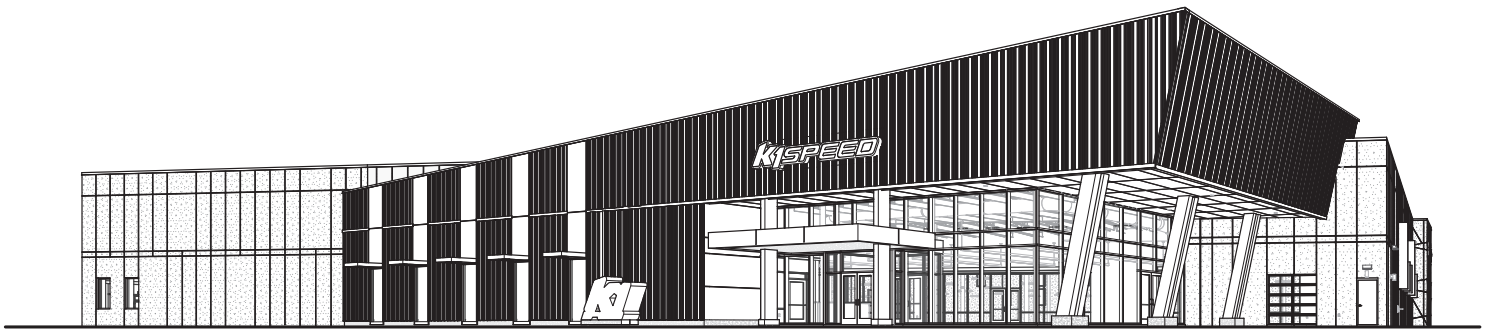
K1 Speed
Entertainment Complex

LOT 4C - STROTHER CROSSING
LEE'S SUMMIT, MISSOURI



PROJECT MANUAL - **VOLUME ONE**
19 JULY 2022

SAL
SLAGGIE
ARCHITECTS INC

K1 Speed Entertainment Complex
Lot 4C – Strother Crossing
Lee's Summit, MO

Owner
DH4 Holdings
10624 S Eastern Ave.
Suite A-925
Henderson, NV 89052

Architect
Slaggie Architects, Inc
4600 Madison Avenue
Suite 350
Kansas City, MO 64112
ph. 816.756.1958

Civil Engineer
BHC Rhodes
7101 College Blvd, Suite 400
Overland Park, KS 66210
ph. 913.663.1900

Landscape Architect
Lorax Design Group
8021 Santa Fe Drive, Suite 200
Overland Park, KS 66204
ph. 913.972.7244

Structural Engineer
Bob D. Campbell & Co.
4338 Belleview
Kansas City, MO 64112
ph. 816.531.4144

Mechanical/Electrical/Plumbing Engineer
Smith & Boucher Engineers
25618 W 103rd St
Olathe, KS 66061
ph. 913.345.2127

SECTION 00 01 05

CERTIFICATIONS

ARCHITECTURAL

I hereby certify that the following architectural specifications were prepared under my direct supervision and that I am a duly Licensed Architect under the laws of the state of Missouri.

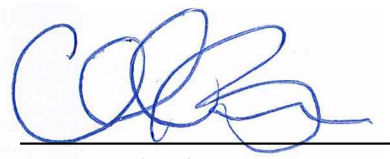
Specification Sections: 000101, 000105, 003100, 011000, 012000, 013000, 013126, 013126a, 013216, 014000, 015000, 015100, 015213, 016000, 017000, 017419, 017800, 033513, 033543, 055000, 055100, 055213, 061000, 064100, 066119, 066510, 072100, 072400, 072726, 074243, 075400, 076200, 077123, 077200, 079200, 081113, 081416, 083100, 083323, 083614, 083815, 084313, 084413, 087100, 088000, 092116, 093000, 095100, 096500, 096536, 096720, 096813, 097720, 099100, 099600, 099723, 102113, 102800, 104400, 107313, 122400, 123600

Date: 7.19.22 Reg. No.: A6386

STRUCTURAL

I hereby certify that the following structural specifications were prepared under my direct supervision and that I am a duly Licensed Engineer under the laws of the state of Missouri.

Specification Sections: 033000, 034500, 042000, 051200, 052100, 053100, 054000



Date: 07/19/22 Reg. No.: PE-2010026832

LANDSCAPE

I hereby certify that the following structural specifications were prepared under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the state of Missouri.

Specification Sections: 329223, 329300, 328470

_____

Date:_____ Reg. No.: _____

MECHANICAL

I hereby certify that the following mechanical specifications were prepared under my direct supervision and that I am a duly Licensed Engineer under the laws of the state of Missouri.

Specification Sections: 210500, 211313, 220500, 220519, 220523, 220529, 220553, 220719, 221116, 221119, 221123, 221316, 221319, 221413, 223300, 224000, 224700, 230500, 230513, 230529, 230553, 230593, 230713, 230719, 230923, 231123, 232113, 232300, 233113, 233300, 233423, 233600, 233713, 233723, 237416.13, 238126, 238239.16

Date: 07/19/2022 Reg. No.: PE-2015006511

ELECTRICAL

I hereby certify that the following electrical specifications were prepared under my direct supervision and that I am a duly Licensed Engineer under the laws of the state of Missouri.

Specification Sections: 260500, 260519, 260523, 260526, 260529, 260533, 260544, 260553, 260573, 260574, 260923, 262413, 262416, 262726, 262813, 262816, 265119, 265219, 265613, 265619, 270500, 270526, 280500, 283111

Date: 07/19/2022 Reg. No.: PE-2015006511

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VOLUME ONE

DIVISION SIX – WOOD, PLASTICS, AND COMPOSITES

DIVISION SEVEN – THERMAL AND MOISTURE PROTECTION

DIVISION EIGHT - OPENINGS

DIVISION NINE - FINISHES

SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of the Contract Documents, as follows:

B. Geotechnical Report: Entitled Geotechnical Exploration and Subgrade Recommendations, K1 Speed Kart Racing Facility, Lee's Summit, MO, dated June 27th, 2022.
   1. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
   2. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
   3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Sum accruing to Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: K1 Speed Kart Racing.

B. Owner's Name: DH4 Holdings.

C. Architect's Name: Slaggie Architects, Inc.

D. The Project consists of the construction of a new, single story 46,700 square foot steel and tilt-up concrete frame, kart racing and entertainment facility as indicated on the Drawings and as specified in the Project Manual.

1.02 WORK BY OWNER

A. Owner will supply and install the following:
   1. Kart Shop Equipment.
   2. Kitchen an Bar Equipment. (GC Install)
   3. Furniture.
   4. Signage.
   5. A/V Equipment and Cabling.
   6. Security/Access Control System and Cabling.
   7. Track Systems and Related Equipment.

1.03 OWNER OCCUPANCY

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

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

C. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Provide access to and from site as required by law and by Owner:

C. 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.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

A. Section 00 50 00 - Contracting Forms and Supplements: Forms to be used.

B. Document 00 52 00 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.

C. Document 00 72 00 - General Conditions and Document 00 73 00 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.

D. Section 01 22 00 - Unit Prices: Payment and modification procedures relating to unit prices.

1.03 SCHEDULE OF VALUES

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

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

C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization.

E. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

F. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

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

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

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

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

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

D. Execute certification by signature of authorized officer.

E. 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.

F. Submit three signed and notorized copies of each Application for Payment.

G. Include the following with the application:
   1. Transmittal letter as specified for Submittals in Section 01 30 00.
   2. Construction progress schedule, revised and current as specified in Section 01 32 16.
   3. Contractor's Affidavit and Partial Release of Claims and Liens for Progress Payment (Form Included in the Project Manual).

4. Partial release of liens from major Subcontractors and vendors.
5. Affidavits attesting to off-site stored products.

H. When Owner or Architect requires substantiating information, submit data justifying dollar amounts in question.

1.05 MODIFICATION PROCEDURES

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

B. The Architect/Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing Architect's/Engineer's Supplemental Instructions (AESI).

C. (AIA G714): Architect/Engineer may issue a document, signed by the Owner and Architect, instructing the Contractor to proceed with a change in the Contract, 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.

D. The Architect/Engineer may issue a Work Changes Proposal Request (WCPR) which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a request for any change in Contract Time for executing the change with a stipulation of any overtime work required and sixty (60) days during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days unless otherwise noted on the WCPR.

E. Contractor may propose a change by submitting a request for change to Architect or Owner as directed, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect or Owner as directed, 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 or Owner as directed.
3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
4. For change ordered by Architect or Owner as directed, without a quotation from Contractor, the amount will be determined by Architect or Owner as directed, based on the Contractor's substantiation of costs as specified for Time and Material work.

G. Substantiation of Costs: Provide full information required for evaluation.
1. Provide 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.

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

I. 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.

J. 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.

K. Promptly enter changes in Project Record Documents.

1.06 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.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 70 00.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

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

D. Number of copies of submittals.

E. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Document 00 73 00 - Supplementary Conditions: Dates for applications for payment.

B. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.

C. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.

D. Section 01 78 00 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: General Contractor.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to Architect through the Project Coordinator:
   1. Requests for information.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Manufacturer's instructions and field reports.
   6. Applications for payment and change order requests.
   7. Progress schedules.
   8. Closeout submittals.

H. The Project Coordinator shall maintain a record of all items noted on the Architect/Engineer's Observation of Work in Progress, the subcontractor responible for completing the work, and the date the work was completed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

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

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.
   4. Prime Subcontractors.
   5. Others deemed necessary by the Architect and General Contractor.

C. Agenda:
   1. Submission of executed bonds and insurance certificates.
   2. Distribution of Contract Documents.
   3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   4. Designation of personnel representing the parties to Contract, Owner and Architect.
   5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   6. Scheduling.
   7. Scheduling activities of a Geotechnical Engineer.

D. The General Contractor shall record minutes and distribute within two days after meeting to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. The General Contractor shall schedule and administer meetings throughout progress of the Work at maximum monthly intervals or as determined by the Architect and Owner.

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

C. Attendance Required: Job Superintendent, General Contractor's Project Manager, Owner's Representative and Architect (or as appropriate to agenda topics for each meeting).

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review status of Architect/Engineer's Observation of Work in Progress.
   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.

E. The General Contractor shall record minutes and distribute within three days after meeting to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE - See Section 01 32 16

3.04 CONSTRUCTION DOCUMENTS

A. The Owner will provide one set of electronic Drawings and Specifications to the General Contractor for his use. Files will be provided in PDF format.

B. The Owner will provide one set of electronic data files for preparation of coordination drawings, shop drawings, etc. Files will be provided in DWG format. Cost of these files will be determined by the Architect.
   1. The following electronic data will be furnished directly to the General Contractor. These are the only electronic data to be provided.
      a. Building structural grid data.
      b. Building floor plan data.
      c. Reflected ceiling plan data.
      d. Mechanical ductwork/diffuser data.
      e. Mechanical piping data.
      f. Sanitary sewer, storm, water and medical gas data.
      g. Lighting data.
      h. Communication data.
      i. Structural frame data.

3.05 SUBMITTALS FOR REVIEW

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

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

C. 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.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

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

3.08 NUMBER OF COPIES OF SUBMITTALS

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in PDF format.
   4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
   5. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements to not apply to samples or color selection charts.

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

3.09 SUBMITTAL PROCEDURES

A. Contractor shall maintain a log of submittals using an Internet based collaboration website to be accessed by the Project Team throughout the project construction to monitor status of each submittal.

B. Submit the following for review:
   1. Schedule of Required Submittals.
   2. Proposed Products List.
   3. Subcontractor and Material Suppliers List.

C. Transmit each submittal with approved form.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. 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.

G. Transmit submittals to Architect in PDF format using the project collaboration website.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Provide space for Contractor and Architect review stamps.

L. When revised for resubmission, identify all changes made since previous submission.

M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

N. Submittals not requested will not be recognized or processed.

3.10 SPECIAL MEETINGS AND INSPECTIONS

A. Compile a list of all special inspections and meetings required for the project as noted in the documents and as required by State and local authorities (Examples: Footing Inspection, Pre-Roofing Conferences, etc.)

B. Submit on the form approved by the Architect.

3.11 REQUESTS FOR INFORMATION (RFI)

A. The Contractor may request in writing, information from the Architect regarding the Documents.

B. All such requests shall be made electronically using an Internet based collaboration website to be accessed by Project Team members.

END OF SECTION

SECTION 01 31 26
ELECTRONIC (CAD) DRAWING FILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to the Work of this Section.

1.2 DESCRIPTION

A. Electronic files shall be transmitted by the Architect, at the Contractor's Request, in AutoCad 2014 format.

B. For the purposes of this project, printed, signed and sealed hard copy documents are the actual contract deliverable.

C. The use of these electronic files shall not in any way reduce the responsibility of the Contractor to verify dimensions, gauges, quantities, weights, construction means and methods, fabrication processes, coordination of the work with other trades, and construction safety precautions.

D. Electronic (CAD) drawing files are transmitted with the understanding and full acknowledgment that the Architect shall be held harmless for the accuracy, unauthorized re-use of the electronic files and unauthorized changes made by the user.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 RELEASE OF LIABILITY

A. The attached "Release of Liability" form shall be fully executed and returned prior to the Architect's Release of the Electronic File.

B. Electronic files shall be for the sole use of the Contractor or Subcontractor that pays the required fee and whose signature is on the Release of Liability form. Use by any other Contractor or Subcontractor is prohibited. Use of electronic files for any purpose other than preparation of shop drawings for this project is prohibited

END OF SECTION

AGREEMENT FOR TRANSFER OF INFORMATION
IN ELECTRONIC CAD FORMAT

Project Name: K1 Kart Racing and Entertainment Facility.

Address: Lot 4C – Strother Crossing.
Lee's Summit, MO 64064

Made this _____ day of _____, 2022.

By and between Slaggie Architects, Inc., Kansas City, Missouri (hereinafter referred to as ARCHITECT), and _____ (hereinafter referred to as RECIPIENT).

The enclosed electronic media are provided pursuant to your request for the purpose of: **Production of Shop Drawings**. In Using it, modifying it, or accessing information form it, you are responsible for confirmation, accuracy, and checking of the data form – the media. ARCHITECT hereby disclaims any and all responsibility from any results obtained in use of this electronic media and does not guarantee any accuracy of the information.

RECIPIENT agrees that it shall not use the information provided by the ARCHITECT for any purpose other than that described above without the express written consent of ARCHITECT. RECIPIENT also hereby acknowledges that the data delivered by ARCHITECT is for use by RECIPIENT only, and is not to be released to any other party without the written consent of the ARCHITECT.

RECIPIENT understands that the automated conversion of information and data from the system and format used by ARCHITECT to an alternate system or format cannot be accomplished without the possibility of introduction of inexactitudes, anomalies, and errors. In the event project documentation provided to RECIPIENT in machine readable form is so converted, RECIPIENT agrees to assume all risk associated therewith, and to the fullest extent permitted by law, to hold harmless and indemnify ARCHITECT from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising therefrom or in connection therewith.

RECIPIENT recognizes that changes or modifications to OWNER'S instruments of professional service introduced by anyone other than ARCHITECT may result in adverse consequences which ARCHITECT can neither predict nor control. Therefore, and in consideration of ARCHITECT'S agreement to deliver its instants of professional service in machine readable form, RECIPIENT agrees, to the fullest extent permitted by laws to hold harmless and indemnify ARCHITECT from and against all claim, liabilities, losses, damages, and costs, including, but not limited to attorney's fee, arising out of or in any way connected with the modification, misrepresentation, misuse, or reuse by others of the machine indemnification applies, without limitation, to any use of the projects documentation on other project, for additions to this project, or for completion of the project by others, excepting only such use as may authorized in writing by ARCHITECT.

Signature _____	Signature _____
Printed Name: _____	Printed Name:_____
Slaggie Architects, Inc.	Company Name: _____
Date: _____	Date:_____

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS

A. Section 01 10 00 - Summary: Work sequence, occupancy, and owner-furnished items.

1.03 SUBMITTALS

A. Within 10 days after date of Agreement, submit a preliminary construction schedule for review by the Architect and Owner.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

B. Within 10 days after joint review and comments by the Architect and Owner, submit complete schedule.

C. Submit updated schedule with each Application for Payment.

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

1.04 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Sheet Size: Multiples of 8-1/2 x 11 inches.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

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

3.02 CONTENT

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

B. Identify each item by specification section number.

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

D. Provide separate schedule of submittal dates for shop drawings, product data, and samples, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

E. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

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

B. Identify the first work day of each week.

3.04 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.

3.05 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Testing and inspection services.

G. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Document 00 31 00 - Available Project Information: Report of Geotechnical Explorations.

B. Section 01 30 00 - Administrative Requirements: Submittal procedures.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor, and Owner.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.

C. 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 conforms to 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/Engineer.

1.04 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. Conform to 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 the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified testing and inspection.

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

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION

3.01 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.

3.02 MOCK-UPS

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

B. Accepted mock-ups shall be a comparison standard for the remaining Work.

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

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. 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-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

C. 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.

D. 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. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.05 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 of equipment and other requirements 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.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to 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

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: fencing.

E. Stairs, ramps, scaffolding and hoists.

F. Waste removal facilities and services.

G. Project identification sign.

1.02 RELATED REQUIREMENTS

A. Section 01 51 00 - Temporary Utilities.

B. Section 01 52 13 - Field Offices and Sheds.

1.03 TEMPORARY UTILITIES - See Section 01 51 00

1.04 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
   2. Telephone Land Lines: One line, minimum; one handset per line.
   3. Internet Connections: Minimum of one; DSL modem or faster.
   4. Email: Account/address reserved for project use.
   5. Facsimile Service: Fax-to-email software on personal computer.

1.05 TEMPORARY SANITARY FACILITIES

A. The General Contractor shall provide and maintain in a neat and sanitary condition chemical type toilet facilities which comply with the requirements and regulations of the Department of Health or of other bodies having jurisdiction. These facilities shall be available to all workers on the job.

B. Maintain daily in clean and sanitary condition.

1.06 FENCING

A. The General Contractor shall provide a suitable construction fence around work area within contract limits, located so as to permit sufficient area for storage of materials and conduct of work by all trades.

B. Materials and methods of fence construction shall be adequate to provide for the safety and security of the project site and shall be the General Contractor's responsibility to select; however as a minimum standard, fence shall be chain link type, minimum five feet high, consisting of 9 gauge wire fabric supported on posts set firmly in the ground at 10 feet o.c. minimum. Provide gates as required. No barbed wire will be permitted.

C. Remove and relocate fence when it interferes with the work of any trade.

D. Keep gates closed at all times and locked during non-working hours. Owner shall be given copy of key to gate.

1.07 STAIRS, RAMPS, SCAFFOLDING AND HOISTS

A. Each Subcontractor shall provide and maintain temporary scaffolding, ramps, and runways as required.

B. Hoisting of materials and equipment shall be provided by the contractor requiring such hoisting.

C. All apparatus, equipment, and construction included in this article shall be in accordance with all applicable state and local laws.

D. The General Contractor shall provide roof protection as necessary where scaffolds and chutes are used.

1.08 WASTE REMOVAL

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

B. Provide containers with lids. Remove trash from site periodically.

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.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.09 PROJECT IDENTIFICATION

A. The General Contractor shall provide project sign of exterior grade plywood and wood frame construction, painted, with exhibit lettering by professional sign painter to Architect/Engineer's design and colors.

B. List title of project, names of Owner, Architect/Engineer, Professional Sub-Consultants, Contractor, and major Subcontractors.

C. Erect on site at location established by Architect/Engineer.

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

E. Provide project identification sign of design and construction indicated on Drawings.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, and water.

1.02 RELATED REQUIREMENTS

A. Section 01 50 00 – Temporary Facilities and Controls.

1.03 TEMPORARY ELECTRICITY

A. Cost: By Contractor.

B. Provide power service required from utility source.

C. Power Service Characteristics: 110-220 volt, 200 ampere, three phase, four wire.

D. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. 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.

1.04 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 1 watt/sq ft or in accordance with OSHA requirements.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lighting and provide routine repairs.

D. Relocate lighting as required and as deemed necessary for progress of construction to maintain lighting levels specified.

1.05 HEAT, VENTILATION AND AIR CONDITIONING

A. As the building is brought to Satisfactory Enclosure, provide temporary heat and ventilation to protect each area and its contents, to prevent freezing within the area, to dry out the area, and to provide suitable working conditions for the installation and curing of materials at temperatures in the range of not less than 55 degrees F. nor more than 75 degrees F. and in conformance with requirements of the various sections of the technical specifications. From at least ten days preceding the start of the installation of millwork, doors, ceiling tile, wall fabric, and other finish items sensitive to temperature and humidity (whichever is started first) interior temperatures shall be maintained at 70 degrees F. and relative humidity shall approximate the conditions of the finish project.

B. The temporary heating system shall be of adequate capacity to properly heat the area, and shall be vented as required so as not to produce fumes or vapors damaging to the building, its contents, or personnel. Temporary ventilation equipment shall be adequate to produce the necessary air movement to dry out and ventilate the area during those times when temporary heating or air conditioning is not required.

C. Provide air conditioning as necessary to maintain 70 deg. F. and humidity conditions approximating those specified for the completed project during the final stages of the work in each area commencing with the time period beginning 10 days preceding the start of installation of millwork, doors, ceiling tile, wall fabric, and other finish items sensitive to temperature and humidity (whichever is started first). The permanent air conditioning system may be used for ventilation whent the building is "closed-in", all dust producing work such as sawing, sanding, etc. has been completed and the building is clean. Approval by the Architect/Engineer and Contractor is required prior to use.

D. Provide the necessary materials, equipment, labor, and operating personnel required to operate the temporary heating, ventilating, and air conditioning system (or permanent system when such is complete and ready for use) throughout the required interval of construction when temporary heating, ventilation, or air conditioning is required.

E. When the permanent system is used for temporary heating, ventilating, and air conditioning provide proper operation and maintenance of the heating, ventilating, and air conditioning plant until Substantial Completion. Such items shall consist of but not be limited to maintenance of temporary filters in all equipment to prevent accumulation of dust and dirt in coils, housings, etc.; temporary protection of ductwork from dust, dirt, etc., through the use of cloth covers over duct openings or similar means; and prior to final inspection, replacement of temporary filters with new filters as specified. Provide a thorough cleaning of coils and other equipment of dust and dirt, putting the entire system into first class condition, including cleaning traps and devices and adjustment and renewal of any and all materials and/or equipment not functioning correctly.

F. All guarantees including manufacturer's warranties for the permanent system shall commence on the Date of Substantial Completion.

G. Provide without delay all electrical service required for the temporary heating and ventilating system (or permanent system when its use is desired).

H. Payment of Utility Bills: Pay costs of all water, electric current, and fuels required until Substantial Completion of the Work. In the event that the Owner should occupy any portion of the project prior to Substantial Completion, utility bills shall be prorated as agreed between the Contractor and the Owner. Such agreement shall be made in writing prior to the Owner incurring any obligations.

1.06 TEMPORARY WATER SERVICE

A. Cost of Water Used: By Contractor.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Connect to existing water source.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 52 13

FIELD OFFICES AND SHEDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary field offices for use of Contractor.

B. Maintenance and removal.

1.02 RELATED REQUIREMENTS

A. Section 01 50 00 - Temporary Facilities and Controls:
   1. Temporary telecommunications services for administrative purposes.
   2. Temporary sanitary facilities required by law.

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.02 CONSTRUCTION

A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.

B. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.03 ENVIRONMENTAL CONTROL

A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

2.04 CONTRACTOR OFFICE AND FACILITIES

A. Size: For Contractor's needs and to provide space for project meetings.

B. Telephone: As specified in Section 01 50 00.

C. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.

D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

3.02 MAINTENANCE AND CLEANING

A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.

B. Maintain approach walks free of mud, water, and snow.

3.03 REMOVAL

A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

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

1.02 RELATED REQUIREMENTS

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

1.03 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 30 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.
   3. Submit using the Form provided.

B. 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.

C. Shop Drawing Submittals: Prepared specifically for this Project. Contract Documents shall not be used for submittals.

D. 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.

E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

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

B. Do not use products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.

2.02 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.

2.03 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

3.01 SUBSTITUTION PROCEDURES

A. Architect will consider requests for substitutions prior to the signing of the Owner/Contractor Agreement. Substitutions will not be considered after the signing of the Owner/Contractor Agreement.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

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

D. A request for substitution 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.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will reimburse the Architect and Engineers for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Equivalent products from manufacturers used as equal to the primary specification must meet dimensional/weight/aesthetic qualities of the primary specification. The Project Coordinator shall provide the Architect documentation clearly demonstrating compliance.

G. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. Provide sample of substitution to Architect/Engineer as requested.
   4. The Architect will notify Contractor in writing of decision to accept or reject request.
   5. Submit using the electronic Form provided.

3.02 TRANSPORTATION AND HANDLING

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

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

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

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

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

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

3.03 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.

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

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

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

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

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

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Cutting and patching.

C. Surveying for laying out the work.

D. Cleaning and protection.

E. Starting of systems and equipment.

F. Demonstration and instruction of Owner personnel.

G. Closeout procedures, except payment procedures.

H. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures.

B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

D. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

1.03 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in Kansas and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering employ a professional engineer of the discipline required for specific service on Project, licensed in Kansas.

1.04 PROJECT CONDITIONS

A. Dewatering:
   1. Prevent surface water and subsurface or ground water from flowing into the excavations and flooding the project site and surrounding area.
   2. Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from excavations.
   3. Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside the excavation limits for each structure. Do not use trench excavations for site utilities as temporary drainage ditches.

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

C. 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.

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

E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

F. 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.

1.05 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 shown 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. Maintain equipment manufacturer's recommended service clearances.

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

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

H. 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

2.01 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.

PART 3 EXECUTION

3.01 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. Under no circumstances shall structural elements be cut, drilled, or otherwise altered without prior approval of the Architect.

3.02 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.

3.03 LAYING OUT THE WORK

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

B. Promptly notify Architect of any discrepancies discovered prior to construction.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that established by Owner provided survey.

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

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

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

H. Utilize recognized engineering survey practices.

I. 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, and floor elevations.

J. Periodically verify layouts by same means.

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

3.04 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. Provide miscellaneous steel for hanging piping, ducts and other equipment as shown or required.

E. Provide curbs and pads for equipment, ductwork and piping. Pads shall be placed under each piece of equipment so that no equipment base sits directly on the floor.

F. All stands shall be adequately cross-braced to provide a rigid supporting foundation. All stands shal lbe adequately anchored to wall or floor.

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

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

3.05 CUTTING AND PATCHING

A. The General Contractor shall be responsible for all cutting, patching, and finishing of walls, floors, roofs, etc., to allow demolition and installation of equipment, piping, ductwork, conduit, wiring, fixtures, etc. by the Mechanical, Plumbing, and Electrical Trades. It is the responsibility of each trade to provide the necessary information to the General Contractor to ensure that hourly ratings of walls, floors, and other penetrations are protected in accordance with approved testing laboratory/manufacturer's instructions. Any openings 6 inch square or less shall be cut by the trade requiring same and holes 5 inch diameter, or less, through concrete shall be core drilled by the trade requiring the hole. Prior to undertaking cutting or drilling operations, the General Contractor shall be consulted to verify that no structural or other damage will be caused by the drilling process. No structural member shall be cut without prior written approval from the Architect.

B. Each trade shall be responsible for coordinating the locations and size of holes that need to be cut by the General Contractor in a timely manner so as to cause no delay in the project progress. Each trade shall be responsible for advising the General Contractor of chase spaces and holes required as the building progresses, including verification of the sizes of all openings shown on the Contract Drawings and to accept equipment, ducts, dampers, etc., being installed under this contract.

C. The Mechanical, Electrical, and Plumbing trades shall supply and set sleeves for piping and inserts for hangers as the building construction progresses and as required for their work.

D. All patching work shall be coordinated by the General Contractor and shall be subject to approval by the Architect before patching can begin. All patching of the exposed finishes shall be done by the appropriate finish Subcontractor. Patches in finish surfaces shall match the adjacent surfaces in material, finish, and quality. The General Contractor shall finish tight against all ductwork, piping, conduit, etc. to make it smoke tight. Any U. L. rated fire seal material and flanges as required by code and the contract documents shall be applied and installed by the Mechanical, Plumbing, or Electrical trade as applicable.

E. The General Contractor shall remove ceilings and re-install as required for access and installation of work of other trades except for mechanical and/or electrical items attached to ceiling. The mechanical and/or electrical contractor respectively shall remove, and where required, re-install all mechanical and/or electrical items which are located in the ceiling.

F. All cutting and patching of elements outside the building wall line shall be done by the trade requiring same.

3.06 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.

3.07 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 plastic coverings if possible.

3.08 SYSTEM STARTUP

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

B. Notify Architect and Engineer seven days prior to start-up of each item.

C. 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.

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

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

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

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

3.09 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 personnel.

3.10 ADJUSTING

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

B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93 and Section 01 40 00.

3.11 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.

B. Use cleaning materials that are nonhazardous.

C. 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.

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

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

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

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

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

3.12 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.

B. Notify Architect when work is considered ready for Substantial Completion.

C. Submit written certification 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 review.

D. Owner will occupy portions of the building as specified in Section 01 10 00.

E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

F. Notify Architect when work is considered finally complete.

G. Complete items of work determined by Architect's final inspection.

3.13 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Furnish service and maintenance of components indicated in specification sections during the warranty period.

D. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

E. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

F. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

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

D. 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.

E. 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.

1.02 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.

PART 3 EXECUTION

3.01 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.

3.02 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00 7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

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

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

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

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

1.03 SUBMITTALS

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

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Owner will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. 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.
   4. 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

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

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

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

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Product substitutions or alternates utilized.
   2. Changes made by Addenda and modifications.

F. The Project Coordinator shall submit for the Architect's review, the current list of all O.W.I.P. action items with the dates of completion and the person responsible for verifying the work was completed. For items not completed at substantial completion, the Project Coordinator shall annotate the anticipated date of completion for each item.

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

3.02 OPERATION AND MAINTENANCE DATA

A. 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.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

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.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves and equipment capacities (input and output), with engineering

data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions, set points and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance, cleaning and operation of described products.

B. Prepare data in the form of an instructional manual. Three manuals will be required.
1. Operation and Maintenance Manual Electronic File: In addition to hard copy manuals, scan operations and maintenance data and assemble complete submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for finishes, equipment and systems.

f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

3.06 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 the 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.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
   1.. Warranty Electronic File: In addition to hard copy manual, scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floor slabs on grade.

B. Concrete footings.

C. Joint devices associated with concrete work.

D. Miscellaneous concrete elements, including equipment pads.

E. Concrete curing.

1.02 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 35 13 - High-Tolerance Concrete Floor Finishing.

D. Section 07 90 05 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.

B. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International.

C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.

E. ACI 305R - Hot Weather Concreting; American Concrete Institute International.

F. ACI 306R - Cold Weather Concreting; American Concrete Institute International.

G. ACI 308R - Guide to Curing Concrete; American Concrete Institute International.

H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.

I. ASTM C 33 - Standard Specification for Concrete Aggregates.

J. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

K. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.

L. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

M. ASTM C 150 - Standard Specification for Portland Cement.

N. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

O. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.

P. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

Q. ASTM C 1107/C 1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

1.04 SUBMITTALS

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

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal portland type.

B. Fine and Coarse Aggregates: ASTM C 33.

C. Fly Ash: ASTM C 618, Class C.

D. Water: Clean and not detrimental to concrete.

2.04 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C 260. Provide one of the following:
   1. Air-Mix or Perma-Air, Euclid Chemical Co.
   2. Darex AEA or Daravair, W. R. Grace & Co.
   3. MB-VR or Micro-Air, Master Builders, Inc.

C. Water-Reducing Admixture: ASTM C 494, Type A - Water Reducing.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
      a. Eucon WR-75, Euclid Chemical Co.
      b. WRDA, W. R. Grace & Co.
      c. Pozzolith Normal or Polyheed, Master Builders, Inc.

D. High Range Water-Reducing Admixture: ASTM C 494, Type F - Water Reducing, High Range and Type G - Water Reducing, High Range and Retarding.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
      a. Eucon 37, Euclid Chemical Co.
      b. WRDA 19 or Daracem, W. R. Grace & Co.
      c. Rheobuild or Polyheed, Master Builders, Inc.

E. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E - Water Reducing and

Accelerating.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Accelguard 80, Euclid Chemical Co.
   b. Daraset, W. R. Grace & Co.
   c. Pozzutec 20, Master Builders, Inc.

F. Water-Reducing, Retarding Admixture: ASTM C 494, Type D - Water Reducing and Retarding.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Eucon Retarder 75, Euclid Chemical Co.
   b. Daratard-17, W. R. Grace & Co.
   c. Pozzolith R, Master Builders, Inc.
2. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.05 ACCESSORY MATERIALS

A. Vapor Retarder: Vapor Retarder membrane must have the following qualities

1. Minimum Permeance ASTM E-96, Does not exceed 0.01 Perms
2. Water Vapor Retarder ASTME-1745 Meets or exceeds Class A
3. Thickness of Retarder (plastic) ACI 302.1R Not less than 15 mils
4. Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4 inches.
5. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions
   a. Stego Wrap (15 mil) Vapor Barrier by Stego Industries, LLC
   b. W.R. Meadows Vapor Mat 15.

B. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type 1, Class B. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.
2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Safe Cure Clear, ChemMasters Co.
   b. Kurez VOX, Euclid Chemical Co.
   c. 1100-Clear, W. R Meadows

C. Water-Based Acrylic Membrane Curing Compound (Exposed Slabs): ASTM C 309, Type 1, Class B.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Dress & Seal WB, L & M Construction Chemicals, Inc.
   b. Aqua-Cure VOX, Euclid Chemical Co.
   c. Kure-N-Seal W, Sonneborn.
   d. Vocomp-20, W. R. Meadows.

D. Evaporation Control: Monomolecular film-forming ASTM C 309, Type 1, Class B.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Safe Cure & Seal 0800, ChemMasters Co.
   b. Aqua-Cure Vox, Euclid Chemical Co.
   c. Clearseal WB Gloss & Seal, Tamms/A.C. Horn

E. Water Repellent: Clear, breathable, deep penetrating 100% saline sealer

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include:
   a. Baracade Silane 100 Euclid Chemical Co

b. Sure Clean Wather Seal SL100 Water Repellant Prosoco
c. MasterProtect H 1000, BASF

F. Non-Shrink Grout: ASTM C 1107/C 1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 28 Days: 7,000 psi.

2.06 BONDING AND JOINTING PRODUCTS

A. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, 1/2 inch thick and 4 inches deep; tongue and groove profile.

B. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with ribbed steel stakes for setting.
1. Height: To suit slab thickness.

C. Sealant and Primer: As specified in Section 07 90 05.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Normal Weight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: As indicated on the Structural Drawings.
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Cement Content: As indicated on Structural Drawings
4. Water-Cement Ratio: As indicated on Structural Drawings.
5. Total Air Content: As indicated on Structural Drawings.
6. Maximum Slump: As indicated on Structural Drawings.

2.08 MIXING

A. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

D. Install Vapor Retarder: Installation shall be in accordance with manufacturer's instructions and ASTM E 1643.
   1. Unroll vapor retarder with the longest dimension parallel with the direction of the pour.
   2. Lap vapor retarder over footings and seal to foundation walls.
   3. Overlap joints 6 inches and seal with manufacturer's tape.
   4. Seal all penetrations (including pipes) with pipe boot and tape.
   5. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.
   6. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all four sides with tape

E. Separate slabs on grade from vertical surfaces with joint filler.

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

G. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 90 05 for finish joint sealer requirements.

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

I. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

J. Place concrete continuously between predetermined expansion, control, and construction joints.

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

L. Place floor slabs in checkerboard or saw cut pattern indicated.

M. Saw cut joints for slabs on grade within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.

N. Screed floors level, maintaining surface flatness in accordance with the requirements in the Contract Documents.

3.04 CONCRETE FINISHING

A. Repair surface defects, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of Section 03 35 13.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure four concrete test cylinders. Obtain test samples for every 50 cu yds. or less of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.

3.07 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

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

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

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

END OF SECTION

SECTION 03 35 13
CONCRETE FLOOR TOLERANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finishing slabs on grade.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Prepared concrete floors ready to receive finish.

B. Section 07 90 05 - Joint Sealers.

1.3 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International.

B. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

C. ASTM E 1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R.

1.5 PROJECT CONDITIONS

A. Coordinate the work with concrete floor placement and concrete floor curing.

1.6 FIELD CONDITIONS

A. Maintain light level equivalent to minimum 200 W light source, placed 8 feet above the floor surface, for each 425 sq ft of floor being finished.

B. Maintain ambient temperature of 50 degrees F minimum.

C. Provide ventilation sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.

B. Steel trowel surfaces that will receive carpeting, resilient flooring, or thin set ceramic tile.

C. Steel trowel surfaces that are scheduled to be exposed unless otherwise indicated.

D. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/4 inch per foot nominal.

3.3 TOLERANCES

A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for flatness.

B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E 1155, within 48 hours after slab installation.

C. Finish concrete to achieve the following tolerances:
   1. Under Porcelain Tile: Ff50 and Fl25.
   2. Under Resilient and Carpet Finishes: Ff 35 and Fl 25.
   3. Exposed to View and Foot Traffic: Ff 35 and Fl 25.

D. Correct the slab surface if tolerances are less than specified.

E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 03 35 43
POLISHED CONCRETE FLOORS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Polished concrete floors.

B. Related Sections:

1. Section 03 30 00 Cast-in-Place Concrete.
2. Section 07 91 16 Joint Fillers.

1.02 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 302.1R Guide for Concrete Floor and Slab Construction.

B. ASTM International:

1. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
2. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.
3. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.

C. Reunion Internationale des Laboratoires D'Essais et de Recherches sur les Materiaux et les Constructions (RILEM):

1. Rilem Test Method 11.4 Standard Measurement of Reduction of Moisture Penetration Through Horizontal Concrete Surfaces.

D. National Floor Safety Institute (NFSI):

1. NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.
2. ANSI Standards B-101.1 – 2009 Manufacturer required to have a letter certifying compliance

1.03 SYSTEM DESCRIPTION

A. Performance Requirements: Provide polished flooring that has been selected, manufactured and installed to achieve the following:

1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
2. Reflectivity: Increase of 35% as determined by standard gloss meter.
3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.

B. Design Requirements:

1. Hardened Concrete Properties:
   a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
   b. Normal Weight Concrete: No lightweight aggregate.
   c. Non-air entrained.

d. Maximum W/Cm ratio of .50.

2. Placement Properties:
    a. Natural concrete slump of 4 inches - 5 inches (100 - 127 mm). Admixtures may be used.
    b. Flatness Requirements:
        1) Overall FF 50.
        2) Local FF 40.
3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.
4. Curing Options:
    a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure).
        1) Acrylic curing and sealing compounds NOT recommended.
    b. Sheet membrane (ASTM C171); polyethylene film not recommended.
    c. Damp Curing: Seven day cure.
    d. Non-membrane curing compound.

1.04 ACTION SUBMITTALS

A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01 30 00 – Administrative Requirements.

B. Shop Drawings: Indicate information on shop drawings as follows:
1. Typical layout including dimensions and floor grinding schedule.
2. Plan view of floor and joint pattern layout.
3. Hardener, sealer, densifier in notes.

C. Product Data: Submit product data, including manufacturer's SPEC-DATA® product sheet, for specified products.
1. Material Safety Data Sheets (MSDS).
2. Preparation and concrete grinding procedures.

1.05 INFORMATION SUBMITTALS

A. Quality Assurance:
1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in 1.03 Performance Requirements.
2. Certificates:
    a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
    b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
    c. Current contractor's certificate signed by manufacturer declaring contractor as an approved installer of polishing system.
3. Manufacturer's Instructions: Manufacturer's installation instructions.

1.06 CLOSEOUT SUBMITTALS

A. Warranty: Submit warranty documents specified.

B. Operation and Maintenance Data: Submit operation and maintenance data for installed products in accordance with Section 01 78 00 - Closeout Submittals.

1. Include:

a. Manufacturer's instructions on maintenance renewal of applied treatments.

b. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.07 QUALITY ASSURANCE

A. Qualifications:

1. Installer with a minimum of 5 years experience in performing work of this section who has specialized in installation of work similar to that required for this project.

2. Installer trained and holding a current certificate as an approved installer by the manufacturer.

3. Current Certification from the CPAA stating that the technicians are trained craftsmen.(delete)

4. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

B. Regulatory Requirements.

1. NFSI Test Method 101-A Phase Two Level High Traction Material.

C. Mock-Ups:

1. Construct field mock-ups in accordance with Section [01 40 00 - Quality Requirements.

2. Mock-Up Size: 100 ft2 (9.3 m2) sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.

3. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, and shine.

4. When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Architect.

5. Mockup will show specified level of aggregate exposure as:

a. Class B – Fine Aggregate (Salt/Pepper) Finish - Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.

6. Mockup to show specified level of gloss level when concrete is mechanically processed as outlined in section 3.03 Installation.

a. Level 2 Sheen, Satin (Matte appearance, with or without slight diffused light) as determined by a gloss reading of 10 – 25 (100 – 400 grit)

Note: Gloss readings are not to be obtained through the use of any topical protective coating enhancers or the result of resin transfer from resin bond abrasives. Take readings before application of these products.

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D. Preinstallation Meetings: Conduct a preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:

1. Environmental requirements.
2. Scheduling and phasing of work.
3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
4. Protection of adjacent surfaces.
5. Surface preparation.
6. Repair of defects and defective work prior to installation.
7. Cleaning.
8. Installation of polished floor finishes.
9. Application of liquid hardener, densifier.
10. Protection of finished surfaces after installation.
11. Do not place any materials on the concrete surface that may cause staining, etching or scratching

1.08 DELIVERY, STORAGE & HANDLING

A. General: Comply with 01 61 00 - Product Requirements.

B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery:

1. Deliver materials in manufacturer's original packaging with identification labels and seals intact.

D. Storage and Protection:

1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
2. Protect concrete slab.
    a. Protect from petroleum stains during construction.
    b. Diaper hydraulic power equipment.
    c. Restrict vehicular parking.
    d. Restrict use of pipe cutting machinery.
    e. Restrict placement of reinforcing steel and storage of other ferrous metals on concrete surfaces.
    f. Restrict use of acids or acidic detergents on concrete surfaces.
    g. Restrict painting activities over concrete surfaces.

1.09 PROJECT AMBIENT CONDITIONS

A. Installation Location: Comply with manufacturer's written recommendations.

1.010 SEQUENCING

A. Sequence With Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

1.011 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

C. Warranty: Commencing on date of acceptance by Owner and Architect.

1.012 MAINTENANCE

A. Comply with manufacturer's written instructions to maintain installed product.

1.013 EXTRA MATERIALS

A. General Contractor to provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 Polished Concrete Finishing Products

A. Manufacturer: L & M Construction Chemicals, a brand of Laticrete International, Inc. (basis of design).

1. Contact: 14851 Calhoun Rd., Omaha, NE 68152-1140; Telephone: (800) 362-3331, (402) 453-6600; Fax: (402) 453-0244; website: www.LMCC.com, www.fgs-permashine.com.

B. Other Acceptable Manufacturers:

1. Ameripolish, Inc.; 120 Commercial Avenue, Lowell AR 72745; Telephone: (800) 592-9320, (479) 725-0033; (479) 725-0031; website: www.ameripolish.com.

C. Proprietary Products/Systems:

1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.

   a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus. Basis of design.

   b. Acceptable Material: L&M Construction Chemicals, Inc., Lion Hard may be substituted when conditions exist where disposing of rinse water is in conflict with local building codes.

2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint filler with Shore A 80 or higher hardness.

   a. Acceptable Material: L & M Construction Chemicals, Inc., Joint Tite 750.

   b. Acceptable Material: L&M Construction Chemicals, Inc., PERK! Restore (for crack repair)

3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant

and compatible with chemically hardened floors.

a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.

4. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).

   a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner.

5. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.

   a. Acceptable Material: L& M Construction Chemicals, Inc. Permaguard SPS

2.03 SOURCE QUALITY CONTROL

A. Ensure concrete finishing components and materials are from single manufacturer.

2.04 PRODUCT SUBSTITUTIONS

A. Use products from one of the specified manufacturers; no substitutions permitted.

PART 3 EXECUTION

3.01 MANUFACTURERS INSTRUCTIONS

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and L & M Construction Chemicals, Inc., Tech-DATA sheets.

B. Use only L & M approved FGS/PermaShine installers.

3.02 EXAMINATION

A. Site Verification of Conditions:

   1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.

B. Verify Concrete Slab Performance Requirements:

   1. Verify concrete is cured to 28 day 3500 psi (24 MPa) strength.
   2. Verify concrete surfaces received a hard steel-trowel finish (3 passes) during placement.
   3. Verify overall floor flatness is a minimum of Ff 50.

3.03 PREPARATION

A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.

B. Examine surface to determine soundness of concrete for polishing.

C. General Contractor to remove surface contamination.

3.04 INSTALLATION

A. Floor Surface Polishing and Treatment:

1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
2. Apply floor finish prior to installation of fixtures and accessories.
3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
    a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
    b. Expose aggregate in concrete surface only as determined by approved mock-up.
    c. All concrete surfaces shall be as uniform in appearance as possible.
4. Apply FGS Hardener Plus, Hardener, Densifier (or Lion Hard) as follows: **Note: It is required that two coats be applied.**
    a. First coat of FGS Hardener Plus at 250 ft^2/gal (6.25 m^2/L), following the 400 grit level. (Lion Hard @ 400-600 sq ft / gallon)
    b. Second coat of FGS Hardener Plus at 350 ft^2/gal (8.75 m^2/L), prior to the final polishing pass. (Lion Hard @ 600-800 sq ft / gallon)
    c. Follow manufacturer's recommendations for drying time between successive coats.
6. Remove defects and re-polish defective areas.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.05 ADJUSTMENTS

A. Re-polish those areas not meeting specified gloss levels per mock-up.

B. Fill joints flush to surface prior to the start of polishing operations

3.06 FINAL CLEANING

A. Upon completion, General Contractor must remove surplus and excess materials, rubbish, tools and equipment.

3.07 PROTECTION

A. Protect installed product from damage during construction.

B. Protect with EZ Cover™ by McTech Corp., Ram Board, or comparable product.

3.08 SCHEDULE

A. Refer to Drawings for colors and locations.

END OF SECTION

SECTION 03 47 13

TILT-UP CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Load-bearing, integrally insulated, tilt-up concrete wall panels with fiber composite wythe tie connectors.
   2. Load bearing, monolithic tilt-up concrete panels.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

C. Design Mixtures: For each concrete mixture.

D. Shop Drawings: Detail fabrication and installation of tilt-up concrete units. Indicate panel locations, plans, elevations, dimensions, shapes, cross sections, and details of steel embedments.
   1. Include additional steel reinforcement to resist hoisting and erection stresses.
   2. Include locations and details of hoisting points and lifting devices for handling and erection.
   3. Include engineering analysis data of additional steel reinforcement and hoisting and erection details, signed and sealed by the qualified professional engineer responsible for their preparation.

E. Welding certificates.

F. Material test reports and certificates.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs a supervisor on Project who is an ACI-certified Tilt-up Supervisor.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."
   2. AWS D1.4, "Structural Welding Code--Reinforcing Steel."

D. Comply with ACI 301, "Specification for Structural Concrete," Sections 1 through 5, unless modified by requirements in the Contract Documents.

F. Preinstallation Conference: Conduct conference at Project site.

PART 2 PRODUCTS

2.01 FORMS

A. Forms: Metal, dressed lumber, or other approved materials that are nonreactive with concrete and that will provide continuous, true, and smooth concrete surfaces.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch.

D. Reveal Strips: Metal, PVC, rubber, straight dressed wood, or plywood; with sides kerfed.

2.02 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

D. Bar Supports: Manufactured according to CRSI's "Manual of Standard Practice" of plastic or CRSI Class 1 plastic-protected steel wire or Class 2 stainless-steel wire.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout the Project:
   1. Portland Cement: ASTM C 150, Type I/II, gray or white.

B. Coarse and Fine Aggregate: ASTM C 33.

C. Water: ASTM C 94/C 94M and potable.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.04 BONDBREAKERS

A. Solvent-Borne, Chemically Reactive Bonbreaker: Penetrating polymerized solution containing no oils, waxes, paraffins, or silicones, and compatible with casting-slab curing compound.

B. Solvent-Borne, Membrane-Forming Bondbreaker: Dissipating polymerized solution containing no oils, waxes, paraffins, or silicones, and compatible with casting-slab curing compound.

C. Waterborne, Chemically Reactive Bondbreaker: Penetrating polymerized emulsion containing no oils, waxes, paraffins, or silicones, and compatible with casting-slab curing compound.

D. Waterborne, Membrane-Forming Bonbreaker: Dissipating polymerized emulsion containing no oils, waxes, paraffins, or silicones, and compatible with casting-slab curing compound.

2.05 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.06 INSULATION SYSTEM

A. Integral Insulation: Extruded Polystyrene Board Insulation: Complying with ASTM C 578, Type IV; with regularly spaced holes identifying connector placement locations.
   1. Supplied with holes to identify connector placements at designated spacing through insulation board surfaces. For field applied holes (7/16" diameter), provide rows of holes no less than four (4) inches and no more than twelve (12) inches from the edges of panels, doors and other panel openings. Provide holes sized for close fit with connectors.
   2. Manufacturer and Product: THERMOMASS Building Insulation System, as supplied by Composite Technologies Corporation, P.O. Box 950, Boone, Iowa 50036 (1-800-232-1748),

B. Structurally Non-Composite Wythe Tie Connectors:
   Non-conductive, non-corrosive, fiber-composite connectors having a minimum tensile strength of 120,000 psi., minimum glass content of 76 percent by weight, and a coefficient of thermal expansion of 5x10-6in/in/°F, nominal.
   1. Central body of connector shall be provided with a flange to limit insertion depth into insulation.
   2. Central body of connector shall have serrated profile to provide interference fit with pre-formed holes in the insulation so as to prevent connector from backing out of insulation after installation.
   3. Manufacturer and Product: THERMOMASS Building Insulation System, as supplied by Composite Technologies Corporation, P.O. Box 950, Boone, Iowa 50036 (1-800-232-1748),

2.07 MISCELLANEOUS MATERIALS

A. Lifting Inserts and Accessories: Furnish inserts, dowels, bolts, nuts, washers, and other items to be cast in panels for tilting and lifting.
   1. Manufacture inserts with feet of plastic, galvanized steel wire, plastic-tipped steel wire, or stainless-steel-tipped steel wire.

B. Bearing Pads: High-density plastic strips.

C. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

D. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents; complying with ASTM C 1107, of consistency suitable for application.

2.08 CONCRETE MIXTURES AND MIXING

A. Prepare design mixtures for each type and strength of concrete, proportioned according to ACI 301 as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.50.
   3. Slump Limit: 4 inches , plus or minus 1 inch.

4. Air Content: 6 percent plus or minus 1.5 percent.
5. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

B. Concrete Mixing: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

PART 3 EXECUTION

3.01 FORMS AND REINFORCEMENT

A. Construct and brace formwork so tilt-up concrete panels are of size, shape, alignment, elevation, and position indicated. Provide for openings, offsets, recesses, reveals, rustications, reglets, and blockouts.
1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concreting. Coat form liner with form-release agent.

B. Bondbreakers: Uniformly and continuously apply two coats of bondbreaker to casting-slab surfaces by power spray or roller according to manufacturer's written instructions, before placing steel reinforcement. Recoat areas subjected to moisture before drying. Maintain continuity of coating until concrete placement.

C. Comply with CRSI's "Manual of Standard Practice" for fabricating and placing reinforcement.

3.02 PANEL CASTING

A. Comply with ACI 301 for handling, placing, and consolidating concrete.

B. Screed panel surfaces to correct level with a straightedge and strike off.
1. Begin initial floating before excess moisture or bleedwater appears on the surface. Use bull floats or darbies to form a uniform and open-textured surface plane free of humps or hollows. Do not disturb panel surfaces before beginning finishing operations.

C. Form chamfers at top edges of panel perimeters, openings, and similar locations not formed by chamfer strips, unless otherwise indicated.

D. Surface Defects: Limit visible surface defects to those permitted by TCA's "Tilt-up Concrete Association's Guideline Specifications" for Grade B, Standard panel surfaces.

E. Casting Tolerances: Cast tilt-up concrete panels without exceeding the tolerances of TCA's "Tilt-up Concrete Association's Guideline Specifications."

3.03 FACE-UP FINISHES

A. Trowel Finish: After applying float finish, apply first trowel finish and consolidate plastic concrete by hand trowel or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and is uniform in texture and appearance.

3.04 FACE-DOWN FINISHES

A. Smooth, As-Cast Finish: Cast panel to produce a surface free of pockets, sand streaks, and honeycombs. Produce a surface appearance of uniform color and texture.

3.05 CONCRETE PROTECTING AND CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures according to ACI 301.
1. Apply evaporation retarder in hot, dry, or windy weather to protect concrete from rapid moisture loss before and during finishing operations. Apply according to manufacturer's written instructions after screeding and bull floating concrete, but before float finishing.

B. Begin curing immediately after finishing concrete. Cure by one or a combination of moisture curing moisture-retaining cover curing and curing compound methods according to ACI 308.1.

3.06 ERECTION

A. Use erection equipment with care to prevent damage to floor slabs and panels.

B. Lift, support, and erect panels only at designated lifting or supporting points indicated on Shop Drawings.

C. Do not erect panels until 75 percent of 28-day compressive strength of concrete has been verified.

D. Install tilt-up concrete panels level, plumb, square, and true. Place panels on leveled grout-setting pads or shims in correct position. Maintain joint width of **1/2 inch (13 mm)**] between panels.
   1. Install tilt-up concrete panels with face-down surfaces exposed to exterior of building.

E. Temporarily brace and support panels securely in position against loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to panels are secured.

F. Anchor panels in place and, if indicated, to one another.
   1. Weld steel connectors to steel supports and embedments indicated, complying with AWS D1.1.

G. Solidly grout-fill gaps between foundation system and bottom of panels.

H. Erection Tolerances: Install tilt-up concrete panels without exceeding the tolerances of TCA's "Tilt-up Concrete Association's Guideline Specifications."

3.07 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Testing Services: Tests shall be performed according to ACI 301.

3.08 FILLING AND REPAIRS

A. Patch holes and voids left by erecting and bracing inserts on tilt-up panels and slabs-on-grade. Cut or chip edges of voids perpendicular to concrete surface. Fill blockouts where indicated.
   1. Clean, dampen with water, and brush-coat holes, voids, and blockouts with bonding agent. Fill and compact with patching mortar of a stiff consistency before bonding agent has dried.
   2. Finish surfaces of fills and repairs to Architect's approval, with materials of same colors and textures as finishes on surrounding surfaces.

B. Repair damage to tilt-up panels and slabs-on-grade resulting from tilt-up work, as directed by Architect.

C. Remove and replace tilt-up panels that do not comply with requirements in this Section.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, support members.

B. Base plates and shear stud connectors.

C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

A. Section 05 21 00 - Steel Joist Framing.

B. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

C. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

D. Section 07 81 00 - Applied Fireproofing: Fireproof protection to framing and metal deck systems.

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.

C. AISC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.

D. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

E. ASTM A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

F. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

G. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

H. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

I. ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes.

J. ASTM C 1107/C 1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

K. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

L. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

1.04 SUBMITTALS

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

B. Shop Drawings:
   1. Materials shall not be fabricated or delivered to the site before the approved shop drawings have been returned to the Contractor. Only shop drawings completely checked by the Fabricator and Contractor will be considered.

2. Manufacturing or fabricating of any material prior to the approval of shop drawings will be at the risk of the Contractor.
3. Approval of shop drawings is for conformance with the Contract Documents only. Contractor is responsible for dimensions, quantities, and coordination with other trades. Drawings shall include all shop and erection details, including cuts, copes, connections, holes, bolts and welds in structural steel.
4. All welds, both shop and field, shall be indicated by standard welding symbols in the American Welding Society Standard Code of Arc and Gas Welding in Building Construction.
5. Drawings shall show the size, length and type of each weld.
6. Approval of shop drawings does not authorize changes to contract requirements unless stated in a separate letter or a change order. Where design details are changed in the preparation of shop drawings in an attempt to improve construction, such changes are to be noted on the shop drawings.

C. Substitutions of Sections: Substitutions of sections or modifications of details, or both, and reasons therefore shall be submitted with shop drawings for approval. Approved substitutions, modifications, and necessary changes in related portions of work shall be coordinated by Contractor and shall be accomplished at no additional cost to Owner.

D. Responsibility for Errors: Contractor shall be responsible for all errors of detailing, fabrication, and for correct fitting of structural members. Make all measurements in field as required to verify or supplement dimensions shown on Drawings and assume all responsibility for fitting all work.

E. Templates: Templates shall be furnished by the Fabricator to the job, together with instructions for the setting of anchors, anchor bolts, and bearing plates. The Contractor shall ascertain that the items are properly set during the progress of the work.

F. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Fabricator: The structural steel shall be fabricated in a plant certified by the AISC as Category STD (Steel Building Structures). Otherwise the structural steel fabricator must demonstrate, to the satisfaction of the Architect and Engineer, a consistent record of a least ten (10) successful projects of equal or greater magnitude over the preceeding two (2) years. The Contractor shall submit evidence in writing verifying one of the above required qualifications within 48 hours of end of bid/negotiation or subject fabricator to disqualification.

C. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.

D. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the state of Kansas for the forces provided on the structural drawings.

1.06 REGULATORY REQUIREMENTS

A. Conform to UL Assembly Design No. indicated on the Drawings or as required by local code.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles and Plates: ASTM A 36/A 36M.

B. Steel W Shapes and Tees: ASTM A 992/A 992M.

C. Rolled Steel Structural Shapes: ASTM A 992/A 992M.

D. Cold-Formed Structural Tubing: ASTM A 500, Grade B.

E. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.

F. High-Strength Structural Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, medium carbon, plain.

G. Welding Materials: AWS D1.1; type required for materials being welded.

H. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 6000 psi at 28 days.

I. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1 - Red or Gray Oxide; 2 mils thick minimum.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Workmanship: Comply with provisions of Part 1 of AISC "Specification of the Design, Fabrication and Erection of Structural Steel for Buildings".

C. Assembly: Structural material shall be fabricated and assembled in shop to greatest extent possible. Shearing, flame cutting, and shipping shall be done carefully and accurately. Parts not completely connected in shop shall be secured by bolts, insofar as is practicable, to prevent damage in shipment and handling.

D. Connections:
1. Shop connections shall, in general, be welded. Field connections shall be bolted with A 325 bolts or welded at contractors' option unless specifically indicated on the construction documents. Connections shall be made to conform to the AISC. One-sided or other types of eccentric connections will not be permitted unless shown on the Drawings.
2. ASTM A 325 bolts shall be used for all bolted connections except where unfinished bolts are shown on the Drawings.
3. Welded conections shall conform to the AISC.
4. Bolted Connections using ASTM A 325 high strength bolts shall conform to the Specification for "Structural Joints Using ASTM A 325 or A 490 Bolts", as approved by Research Council on Riveted and Bolted Structural Joints and endorsed by the American Institute of Steel Construction. Bolt threads shall be excluded from the shear planes of the contact surfaces between the connected parts.

E. Space shear stud connectors as indicated on the Drawings.

F. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

G. Fabricate connections for bolt, nut, and washer connectors.

H. Develop required camber for members as indicated on the Drawings.

2.03 FINISH

A. Shop prime structural steel members with standard gray primer. Do not prime surfaces that will be on top flange of beams to receive shear studs, fireproofed, field welded, in contact with concrete, or high strength bolted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

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

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Alignment:
   1. After assembly, the various members forming parts of a completed frame or structure shall be aligned and adjusted accurately before tightening bolts. Tolerance shall conform to AISC. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled. As erection progresses, the work shall be securely fastened to take care of all dead load, wind and erection stresses. Splices will be permitted only where indicated.
   2. Unless removal is required, all erection bolts used in welded construction may be tightened securely and left in place. Where erection bolts are removed, the holes shall be filled with plug welds and ground smooth. Welding for redrilling will not be permitted.

H. Bolting:
   1. There shall first be enough bolts brought to a "snug tight" condition to insure that the parts of the joint are brought into good contact with each other. Snug tight is defined as the tightness that exist when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. Following this initial operation, bolts shall be placed in any remaining holes in the connection and brought to snug tightness. All bolts in the connection shall then be tightened additionally one half turn of the nut, with tightening progressing systematically from the most rigid part of the joint to its free edges. During this operation there shall be no rotation of the part not turned by the wrench.
   2. Bolts in slip critical connections, connections subject to direct tension, and fully pre-tensioned bearing connections shall be installed in properly aligned holes and tightened by one of the methods described in Subsections 8.2.1 through 8.2.4 of the "Specification For Structural Joints Using ASTM A325 or A490 Bolts" to at least the minimum tension specified in Table 8.1 when all fasteners are tight.

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

J. Driftpins: May be used only to bring together the several parts, and shall not be used in such a

manner as to distort or damage the metal.

K. Cutting: The use of a gas cutting torch in the field for correcting fabrication errors shall not be done on any major member in the structural framing. The use of a gas cutting torch is permissible only on minor member, when the member is not under stress, and only when the approval of the Architect has been specifically given.

L. Bracing: The frame of steel skeleton buildings shall be carried up true and plumb, within limits defined in the Code of Standard Practice, latest edition, of the American Institute of Steel Construction. Temporary bracing shall be provided, in accordance with the requirements of the Code of Standard Practice, wherever necessary to take care of all loads to which the structure may be subjected, including equipment and the operation of same. Such bracing shall be left in place as long as may be required for safety.

M. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. General:
1. Owner shall employ an Independent Testing Laboratory (ITL) to inspect high-strength bolted connections, welded connections, perform tests, and prepare test reports.
2. ITL shall conduct/interpret tests and state in each report whether test specimens comply with requirements and specifically state any deviations therefrom.
3. The Contractor shall correct deficiencies in structural steel work which inspections/laboratory test reports have indicated are not in compliance with requirements. Additional tests as necessary shall be performed by the ITL to reconfirm any non-compliance of original work. Such tests and/or additional services of the Architect made necessary by such non-compliance shall be paid for by the Contractor.

B. Structural Steel Testing:
1. ITL will secure samples of structural steel, not identified by mill test reports, heat or melt numbers, in ample quantities to perform structural tests on 5% by weight of all unidentified steel which will consist of tensile, bend, and elongation tests per ASTM A 370.

C. Field Welding:
1. The ITL will inspect/test during erection of structural steel assemblies in accordance with the following: AWS D1.1.
   a. Certify welders and conduct inspection/tests as required. Record types/location of all defects found in work. Record work required and performed to correct deficiencies.
   b. Perform visual inspection of all welds for size, pinholes, undercut, and overlap. Any visual indication of cracks shall be checked further using magnetic particle testing methods.
   c. Perform non-destructive tests of welds as follows:
      1) Fillet welds - one (1) spot per member. Magnetic particle testing may be used.
      2) Partial penetration welds - one (1) spot test per weld using magnetic particle testing techniques.
      3) Full penetration welds - Test entire length of all field welds. Use radio-graphic or ultrasonic testing techniques.
   d. Correction for complete weld rejection shall be same as described under shop inspection/testing.

D. High Strength Bolted Connections:
1. The ITL will inspect in accordance with the following:

a. AISC specification for structural joists.
b. Visually inspect all bolts.

E. Check for proper torque with calibrated torque wrench:
1. Minimum of two (2) bolts of every third connection between floor beams and girders.
2. Minimum of two (2) bolts of every connection between girders and columns.
3. All bolted connections that fail shall be corrected and all bolts in that connection shall be retested.

F. Metal Deck:
1. Verify metal deck is attached to the structural frame in accordance with manufacturer's recommendations and approved shop drawings.

END OF SECTION

SECTION 05 21 00

STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Open web steel joists and girders, with bridging, attached seats and anchors.

B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.

C. Supplementary framing for roof openings greater than 18 inches.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Superstructure framing.

B. Section 05 31 00 - Steel Decking: Support framing for openings less than 18 inches in decking.

C. Section 05 50 00 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.03 REFERENCE STANDARDS

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

B. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

C. SJI (SPEC) - Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders; Steel Joist Institute.

D. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; Steel Joist Institute.

E. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings.

F. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

G. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

C. Design and Installation Requirements: Conform to Assembly Design Nos indicated.

1.05 QUALITY ASSURANCE

A. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Kansas.

B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI Standard Specifications Load Tables and SJI Technical Digest No.9.

C. Design and Installation Requirements: Conform to UL Assembly Design No. indicated on the Drawings or required by code.

D. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience.

E. Erector Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Open Web Joists: SJI Type K Joists:
   1. Provide top chord extensions as indicated.
   2. End bearing of 2-1/2 inches on steel supports.
   3. Finish: Shop primed, color: standard gray.

B. Anchor Bolts, Nuts and Washers: ASTM A325 (A 325M).

C. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.

D. Welding Materials: AWS D1.1; type required for materials being welded.

E. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.

2.02 K-SERIES STEEL JOISTS

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

   1. Joist Type: **K-series steel joists and KCS-type K-series steel joists**

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

C. Provide holes in chord members for connecting and securing other construction to joists.

D. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."

E. Do not camber joists.

F. Camber joists **according to SJI's "Specifications."**

G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.03 LONG-SPAN STEEL JOISTS

A. Manufacture steel joists according to "Standard Specification for Longspan Steel Joists, LH-Series in SJI's "Specifications," with steel-angle top and bottom chord members; of joist type and end and top-chord arrangements as follows:
B. Joist Type: LH-series steel joists
C. Top-Chord Arrangement: Parallel
D. Provide holes in chord members for connecting and securing other construction to joists.
E. Camber long-span steel joists according to SJI's "Specifications."
F. Equip bearing ends of joists with manufacturer's standard sloped shoes.

2.04 FABRICATION

A. General: All joists shall be open-web truss type conforming to the Standard of the Steel Joists Institute, latest edition, and all applicable building codes. Series and spaces of joists shall be as indicated. Top and bottom chords shall consist of double angles. Provide top chord pitch on joist as shown on the Drawings. Joists shall be designed to support a net uplift load as shown on the Drawings.
   1. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards, requirements of applicable SJI "Specifications" and load tables.
   2. Bridging: Provide diagonal type bridging for open web joists, complying with SJI "Specifications". Provide bridging anchors for ends of bridging lines terminating at walls or beams. Bridging shall consist of bolted or welded cross bracing or horizontal bridging as indicated. L/r shall not exceed 200. Spacing shall conform to Steel Joist Institute Specifications, latest edition.
   3. End Anchorage: Provide end anchorages including bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications", unless otherwise indicated.

2.05 FINISH

A. Shop prime joists by removing loose scale, heavy rust and other foreign materials from fabricated joists and accessories before application of shop paint.
   1. Apply one shop coat of steel prime paint to joists and accessories, by spray, dipping, or other method to provide a continuous dry paint film thickness of not than 0.50 mil.
   2. Do not prime surfaces that will be fireproofed.
   3. Color: Standard gray

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.

D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

E. Position and field weld joist chord extensions and wall attachments as detailed.

F. Install supplementary framing for floor and roof openings greater than 9 inches square.

G. Do not permit erection of decking until joists are braced bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

H. Do not field cut or alter structural members without approval of joist manufacturer.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Welded Connections: Visually inspect all field-welded connections and all field bolted connections.

C. Testing Agency shall report test results promptly and in writing to the Contractor and Architect/Engineer.

D. Correct deficiencies in work that inspection and test reports have indicated are not in compliance with specification requirements.

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof deck.

B. Supplementary framing for openings up to and including 18 inches square.

C. Bearing plates and angles.

D. Acoustical insulation in roof deck flutes.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches.

B. Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 18 inches.

C. Section 07 81 00 - Applied Fireproofing: Spray applied fireproofing.

1.03 REFERENCE STANDARDS

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

E. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society.

F. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.

G. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Submittals, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 6 months.

1.05 QUALITY ASSURANCE

A. Design deck layout, spans, fastening and joints in accordance with Steel Deck Institute specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Deck:
   1. Metal Dek Group: www.metaldek.com
   2. Canam Steel Corporation: www.canam-steeljoists.ws.
   3. Nucor-Vulcraft Group: www.vulcraft.com.
   4. Wheeling Corrugating Co: www.wheelingcorrugating.com.

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

2.02 ROOF DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural working stress design and structural properties specified.
   2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
   3. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
   4. Maximum Lateral Deflection of Diaphragms: 1/500 of the height of the wall.

B. Roof Deck: Non-composite type, fluted steel sheet:
   1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), with G60/Z180 galvanized coating.
      a. Grade as indicated in structural drawings.
   2. Primer: Shop coat of manufacturer's standard gray primer paint over cleaned and phosphatized substrate, bottom surface only.
   3. Minimum Metal Thickness, Excluding Finish: As indicated on the Drawings.
   4. Nominal Height: As indicated on the Drawings.
   5. Deck: Shall be of type indicated on structural drawings. Minimum length of deck shall provide a three span condition over supporting members. The gauge of deck shall be as indicated on the Drawings.
   6. Side Joints: Lock seam - screwed #10 TEKS per manufacturer (36” maximum spacing or as required per contract documents).
   7. End Joints: Lapped, welded at 12 inches o.c. or as required per contract documents.

2.03 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A 36/A 36M steel, unfinished.

B. Welding Materials: AWS D1.1.

C. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction. Color: standard gray.

D. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

E. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.05 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips and cover plates, 22 gage thick sheet steel; of profile and size as indicated; finished same as deck.

B. Floor Drain Pans: 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below

floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, requirements in this Section, and as indicated.
B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
H. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1½ inches (38 mm.)
I. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches (305 mm) apart with at least one fastener at each corner.
    1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.
J. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Mechanically fasten to substrate to provide a complete deck installation.
    1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
K. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
L. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.
C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
D. Remove and replace work that does not comply with specified requirements.
E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.04 REPAIRS

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

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

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-load bearing cold-formed steel stud exterior wall framing.

B. Exterior wall sheathing.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel: Structural building framing.

B. Section 05 31 00 - Steel Decking.

C. Section 07 21 00 - Thermal Insulation: Insulation within framing members.

D. Section 07 25 00 - Weather Barriers: Weather barrier over sheathing.

1.03 REFERENCE STANDARDS

A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM C 955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

D. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

F. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
3. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those

performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

D. Shop drawings must be approved in writing by the Architect before work can begin.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:
   1. Dietrich Metal Framing: www.dietrichindustries.com.
   2. Marino\Ware: www.marinoware.com.
   3. MiTek Industries, Inc: www.mitek-us.com/core.asp.
   4. The Steel Network, Inc: www.SteelNetwork.com.

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

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Metal Framing Connectors and Accessories:
   1. Same manufacturer as framing.
   2. The Steel Network Inc: www.SteelNetwork.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C 955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
   1. Gage and depth: As required to meet specified performance levels.
   2. Galvanized in accordance with ASTM A 653/A 653M G90/Z275 coating.

B. Connector Devices:
   1. Vertical Deflection Clips: As indicated on Structural Drawings.
   2. Drift System Clips: As indicated on Structural Drawings.
   3. Rigid Clip Angles: As indicated on Structural Drawings.
   4. Roof Ties: As indicated on Structural Drawings.

C. Bridging:
   1. As indicated on Structural Drawings.

2.04 SHEATHING

A. Wall Sheathing: Glass mat faced gypsum; ASTM C 1177/C 1177M, square long edges, 1/2 inch. Provide Dens Glass Gold manufactured by Georgia Pacific or approved equal.

B. Parapet Wall Sheathing: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick. Provide Dens Deck manufactured by Georgia Pacific or approved equal.

2.05 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

C. Water-Resistive Barrier: As specified in Section 07 25 00.

2.06 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A 153/A 153M.

B. Anchorage Devices: Power actuated.

C. Welding: In conformance with AWS D1.1.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION OF STUDS

A. Install components in accordance with manufacturers' instructions.

B. Align floor and ceiling tracks with wall layout. Secure in place with fasteners as indicated on Structural Drawings. Coordinate installation of sealant with floor and ceiling tracks.

C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.

D. Construct corners using minimum of three studs. Install minimum double studs at wall openings, door and window jambs unless calculations indicate more are required.

E. Install studs full length in one piece. Splicing of studs is not permitted.

F. Install studs, brace, and reinforce to develop full strength and achieve design requirements.

G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

H. Install intermediate studs above and below openings to align with wall stud spacing.

I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

K. Touch-up field welds and damaged galvanized surfaces with primer.

3.03 FRAMING ACCESSORY INSTALLATION

A. Install accessories as required by structural design calculations. Provide appropriate fasteners in all predrilled holes backed by another framing member.

3.04 WALL SHEATHING

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
   1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.05 PARAPET SHEATHING

A. Parapet Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

3.06 TOLERANCES

A. Maximum Variation from True Position: 1/8 inch.

B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Shelf angles.
5. Metal ladders.
6. Metal ships ladders.
7. Metal floor plate.
8. Structural steel door frames.
9. Miscellaneous steel trim including steel angle corner guards, steel edgings, and loading dock edge angles.
10. Metal bollards.
11. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 04 20 00 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Section 05 12 00 "Structural Steel Framing."

1.2 COORDINATION

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

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 SUBMITTALS

A. Product Data: For the following:
   1. Grout.
   2. Paint products.

B. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:
   1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
   2. Metal ladders.
   3. Metal ships ladders.
   4. Metal bollards.
   5. Loose steel lintels.

C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data: For professional engineer.

E. Welding certificates.

1.4 QUALITY ASSURANCE

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

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design ladders.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

D. Rolled Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A

36M or ASTM A 283/A 283M, Grade C or D.

E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

G. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

H. Construction Adhesive for gluing panels to wall substrate: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

I. Steel Closure Panels and Bent Plates: Unless otherwise indicated, provide Type 304 stainless-steel fasteners. Select fasteners for type, grade, and class required.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09 91 00 "Painting."

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by

manufacturer for interior and exterior applications.

E. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metal cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Furnish inserts for units installed after concrete is placed.
   2. Fabricate units from slotted channel framing where indicated.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with primer specified in Section 09 91 00 "Painting" where indicated.

2.7 METAL LADDERS

A. General:
   1. Comply with ANSI A14.3.

B. Steel Ladders:
   1. Space siderails 18 inches apart unless otherwise indicated.
   2. Siderails: Continuous, 3/8-by-3-inch steel flat bars, with eased edges.
   3. Rungs: 3/4-inch- diameter steel bars.
   4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
   5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Harsco Industrial IKG, a division of Harsco Corporation; Mebac.
         2) SlipNOT Metal Safety Flooring, a division of W. S. Molnar Company; SlipNOT.
   6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
   7. Galvanize and prime ladders, including brackets.

C. Aluminum Ladders:
   1. Aluminum; in compliance with ANSI A14.3; with mounting brackets and attachments; mill finish.
   2. Side Rails: 2 inch x 3 inch tubular members spaced at 20 inches apart.
   3. Rungs: One inch square with serrated top, spaced at 12 inches on center.
   4. Space rungs 7 inches from wall surface.

2.8 METAL FLOOR PLATE

A. Fabricate from rolled-steel floor plate of thickness indicated below:
   1. Thickness: As indicated.

B. Provide grating sections where indicated fabricated from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 3/4 inch in least dimension.

C. Provide steel angle supports as indicated.

D. hclude steel angle stiffeners, and fixed and removable sections as indicated.

E. Provide flush steel bar drop handles for lifting removable sections, one at each end of each section.

2.9 STRUCTURAL-STEEL DOOR FRAMES

A. Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inchsteel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches o.c. Reinforce frames and drill and tap as necessary to accept finish hardware.
   1. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete or masonry.

B. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.

2.10 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
   1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize and prime miscellaneous steel trim.

2.11 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

B. Hot dip galvanize metal bollards.

2.12 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Hot dip galvanize plates.

2.13 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Hot dip galvanize and prime loose steel lintels located in exterior walls.

2.14 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.16 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
   1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
   1. Shop prime with primers specified in Section 09 91 00 "Painting."

D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing panels and bent plates. Set wall panels, closure panels and bent plates accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed edges of wall panels accurately together to form hairline joints.

C. Fasten wall panels to wall substrate with construction adhesive to obtain fully adhered panel.

D. Fasten closure panels and bent plates to wall substrate with stainless steel fasteners.

E. Field Welding: Comply with the following requirements:

   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

G. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING METAL BOLLARDS

A. Anchor bollards in concrete in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 00 "Painting."

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

END OF SECTION

SECTION 05 51 00

METAL STAIRS

(CONCRETE TREADS)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stairs with concrete treads.

B. Structural steel stair framing and supports.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete fill in stair pans and landings.

B. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

D. Section 05 50 00 - Metal Fabrications.

E. Section 09 90 00 - Painting: Paint finish.

F. Section 05 52 13 – Pipe and Tube Railings.

1.3 REFERENCE STANDARDS

A. ASTM A 6/A 6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

C. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

E. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

F. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

G. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

H. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

I. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

L. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

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

B. Welders' Certificates: Submit under provisions of Section 01 40 00, certifying welders employed on the Work, verifying AWS qualification within the previous 6 months.

PART 2 PRODUCTS

2.1 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Delegated Structural Design: Provide complete metal stairs and railing assemblies including comprehensive engineering analysis by a qualified engineer, complying with the following:
      a. Stair Capacity: Uniform live load of 100 lb/sq ft and a concentrated load of 300 lb with deflection of stringer or landing framing not to exceed 1/180 of span.
      b. Railing Assemblies: Comply with ASTM E 985.
   3. Dimensions: As indicated on drawings.
   4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   6. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.
      b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
      c. Exposed Edges and Corners: Eased to small uniform radius.
      d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.2 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
   1. Concrete Depth: 1-1/2 inches, minimum.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   5. Concrete Reinforcement: None.
   6. Concrete Finish: Steel trowel

D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
   2. Nosing Depth: Not more than 1-1/2 inch overhang.
   3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
   4. Stringers: Rolled steel channel, Stringer Depth: 10 inches.
   5. End Closure: Sheet steel of same thickness as risers welded across ends.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Railings: As detailed.

G. Finish: Shop or factory-prime painted.

2.3 HANDRAILS AND GUARDS

A. Refer to Section 05 52 13 Pipe and Tube Railings.

2.4 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 or ASTM A 501 structural tubing, round and shapes as indicated.

C. Steel Plates: ASTM A 6/A 6M or ASTM A 283/A 283M.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
   1. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Designation CS (commercial steel).
   2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Designation CS (commercial steel).

F. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230 with G90/Z275 coating.

G. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.

H. Steel Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1.

I. Welding Materials: AWS D1.1; type required for materials being welded.

J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.5 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.

   1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

D. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: One.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 52 13
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair and ramp railings and guardrails.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04 20 00 - Unit Masonry: Placement of anchors in masonry.

C. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

D. Section 09 96 00 – High Performance Coating Systems: Finish coating on rails.

1.03 REFERENCE STANDARDS

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.

D. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

E. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

F. SSPC-Paint 15 - Steel Joist Shop Paint; The Society for Protective Coatings; 1999 (Ed. 2004).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

1.04 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.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.

B. 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 E 935.

C. 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 E 935.

D. Allow for expansion and contraction of members and building movement without damage to connections or members.

E. Dimensions: See drawings for configurations and heights.

F. 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 stud walls, provide backing plates, for bolting anchors.

G. 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.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A 500, Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black and galvanized finish, as indicated.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

E. Straight Splice Connectors: Steel concealed spigots.

F. Galvanizing: In accordance with requirements of ASTM A123/A123M.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 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.

D. Finish: Refer to Section 09 96 00 High Performance Coating Systems.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 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. Anchor railings securely to structure.

D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.03 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

1.01 SECTION INCLUDES

A. Roofing nailers.

B. Preservative treated wood materials.

C. Miscellaneous framing and sheathing.

D. Communications and electrical room mounting boards.

E. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association.

D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).

E. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc..

1.04 SUBMITTALS

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

B. Product Data: Provide technical data on wood preservative materials.

1.05 QUALITY ASSURANCE

A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
   1. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

B. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Exposed Blocking and Other Miscellaneous Wood Framing:
   1. Construction Grade No. 1 or better Douglas Fir-Larch, Hem-Fir, and Western Hemlock or mixed white woods (S-P-F).
   2. Where exposed material: Sound, straight, clean, and smooth (sand if required).

B. Concealed Blocking: Standard Grade No. 2 or better Douglas Fir-Larch, Hem-Fir, Western Hemlock, Southern Pine, or mixed white woods (S-P-F).

C. Wood Furring Strips: Thickness as indicated on Drawings or equivalent thickness to match infill material, but not less than 2 inches wide by 3/4 inches thick.

2.02 CONSTRUCTION PLYWOODS AND SHEATHINGS

A. Concealed Sheathing: APA plywood touch-sanded C-D plugged, Group 2.
   1. Exposure: Exposure 1.
   2. Thickness: 5/8 inch, unless otherwise indicated.

B. Concealed Sheathing for Wet Area: APA plywood touch-sanded C-D plugged, Group 2.
   1. Exposure: Exterior.
   2. Thickness: 5/8 inch, unless otherwise indicated.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for preservative-treated wood locations, unfinished steel elsewhere.

B. Sill Flashing: As specified in Section 07 62 00.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Chemical Specialties, Inc: www.treatedwood.com.
      c. Osmose, Inc: www.osmose.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry, concrete, or exposed to weather.

0.06 FIRE RETARDANT TREATMENT

A. Pressure Impregnated Fire Treatment: Bearing Underwriters Laboratories, Inc., label with fire hazard classification of 25 or less or FRS classification (Guide BPVV).
   1. Flame spread: Not more than 25 with no increase in fire hazard classification when test is extended to 30 minutes in compliance with Uniform Building Code (UBC) Standard No. 42-1.
   2. Identification: Mark each piece with performance identification label or mark of UL. Provide identification mark at intervals required by inspection officials having jurisdiction.
   3. Acceptable manufacturers and processes for typical applications.
      a. Hickson Corp.: Dricon.
      b. Hoover Treated Wood Products, Inc.: Pyro-Guard.

B. Moisture Content for Lumber and Plywood:
   1. Materials exposed to view in finished Work: Kiln dry to not more than 12 percent moisture content after treatment.
   2. Concealed plywood: Dry to not more than 15 percent moisture content after treatment.
   3. Concealed lumber: Dry to not more than 19 percent moisture content after treatment.

C. Schedule of Fire Retardant Treatment:
   1. Concealed blocking (dimensional and plywoods).
   2. Exposed materials.

PART 3 EXECUTION

3.01 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.

3.02 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 code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. 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.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Specifically, provide the following non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Handrails.
   3. Grab bars.
   4. Towel and bath accessories.
   5. Wall-mounted door stops.
   6. Joints of rigid wall coverings that occur between studs.

3.03 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 on center on all edges and into studs in field of board.
   1. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   2. Install adjacent boards without gaps.
   3. Size and Location: As indicated on drawings.

3.05 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.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. **Section Includes:**
   1. Plastic laminate casework.
   2. Cabinet hardware.
   3. Accessories.

1.02 DEFINITIONS

A. **The following definitions apply** to this Section as they pertain to surfaces of casework units or items.
   1. Definitions of terms "Exposed", Semi-Exposed", and "Concealed": Comply with Section 400-G-3 of the AWI Quality Standards.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program, www.awiqcp.org.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.

C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.

D. PS 1 - Structural Plywood.

1.03 SYSTEM DESCRIPTION

A. **Pre-fabricated, shop-assembled** custom casework and related items, worksurfaces and accessories furnished and installed under a single source responsibility.

1.04 SUBMITTALS

A. **Product Data:** Manufacturer's specifications and technical data including performance, construction and fabrication.
   1. Catalog cuts and detailed specifications of construction and fabrication.
   2. Manufacturer's installation instructions.

B. **Shop Drawings:** Indicate dimensions, description of materials and finishes, general construction, component connections, anchorage methods, hardware, and installation procedures, including specific requirements indicated.
   1. Include section drawings of typical and special casework, work surfaces and accessories.
   2. Indicate locations of plumbing and electrical service field connections.

C. **Component Samples:** Two sets of samples for each of the following items as specified:
   1. Plastic laminate for color and texture/finish.
   2. Submit actual samples of proposed pulls and hinges demonstrating hardware design, quality and finish.

D. **Quality Assurance Submittals:**
   1. Manufacturer/fabricator qualifications.

1.05 QUALITY ASSURANCE

A. **Fabricator's Qualifications:** Not less than 5 years experience in the actual production of specified products.
   1. Experienced in installation of casework similar in complexity to those required for this Project plus the following.
   2. Successfully completed at least 5 comparable projects installing casework.

B. **Quality Grade:** Perform Work to comply with AWI Custom Quality Grade, except countertops shall be AWI Premium Grade. Work shall conform to the requirements of the applicable Sections of the referenced AWI Quality Standards as they pertain to the Quality Grade specified, unless specified otherwise herein. References made to individual Sections of the AWI Standards does not imply that other Sections of the Quality Standards do not apply. In all cases the Quality Grade specified applies throughout the Work.

C. **Quality Grade Stamp:** Affix the AWI Quality Grade Stamp to each unit of product where stamp will be concealed in the finished work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. **Packing and Shipping:** Deliver products in original unopened packaging with legible manufacturer's identification.

B. **Acceptance at Site:** Do not deliver casework to site until spaces in which it will be installed are ready to receive it.

C. **Storage and Protection:** Comply with manufacturer's recommendations.

1.07 PROJECT CONDITIONS

A. **Environmental Requirements:** Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for not less than 1 week.
   1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
   2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

B. **Conditions:** Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. **Acceptable Millworkers and Fabricators for other Architectural Millwork Items:** Subject to compliance with this specification regardless of manufacturer's standards.
   1. Any member of AWI, meeting experience requirements indicated herein.

2.02 LAMINATE MATERIALS

A. **High Pressure Decorative Plastic Laminate:** High pressure plastic laminate conforming to NEMA LD-3, of the following grades:
   1. Horizontal grade plastic laminate: HGS, 0.048 inch nominal thickness.
   2. Postforming grade plastic laminate: HGP, 0.039 inch nominal thickness.
   3. Vertical grade plastic laminate: VGS, 0.028 inch nominal thickness.
   4. Reference finish legend for manufacturer and color.

B. **Backing Grade Plastic Laminate:** BKL, .020 inch nominal thickness.
   1. Color: To be selected by Architect.

C. **Cabinet Liner Grade Plastic Laminate:** CLS, 0.020 inch nominal thickness.
   1. Color: To be selected by Architect.

D. **Melamine Laminate:** Permalam thermally fused melamine conforming to requirements of ALA 1988.
   1. Color: To be selected by Architect.

2.03 CORE MATERIALS

A. **Coreboard:** Medium density particleboard, conforming to ANSI A208.1, type 1, grade 1-M-2 or 1-M-3.

B. **Fire Rated Coreboard:** Fire rated medium density fiberboard, conforming to ANSI A208.1, type 1, grade 1-M-1, and tested to comply with UL 723 to achieve the following flame spread and smoke developed properties:
   1. Flame spread: 20.
   2. Smoke developed: 25.
   3. Acceptable manufacturer and product: Willamette Industries, Inc. Duraflake FR.

C. **Water-Resistant Coreboard:** Water-resistant medium density fiberboard, conforming to ANSI A208.1, type 2, grade 2-M-2 or 2-M-3, and to ASTM D1037-87.
   1. Acceptable manufacturer and product: Medite Corp.; Exterior Medex.

2.04 MISCELLANEOUS MATERIALS

A. **Hardboard:** 1/4 inch tempered hardboard, smooth both sides, conforming to ANSI A135.4. Fabricator primed and painted. Color as selected.

2.05 FABRICATION

A. **Plastic Laminate Casework Construction:** Combination of custom and modular plastic laminate casework to conform to program and functional requirements.
   1. AWI Custom Grade construction, Section 400B.
   2. Type of Construction: "Flush Overlay" construction with concealed hinges.
   3. Fabrication: Comply with Section 400B-S-8.
      a. Shelf supports: Comply with Section 400B-S-7, except limited to multiple hole support technique.
      b. Drawer Construction: Comply with Sections 400B-S-4, 400B-S-5, and 400B-S-6.
   4. PVC Edge Banding at "modular" plastic laminate casework:
      a. 3 mm flat PVC edge banding, unless otherwise indicated.
         1) Doors and drawers, color as indicated.
         2) Cabinet bodies, spreaders, intermediate frames and rails, color as specified for doors and drawers.
         3) Shelves behind solid doors, on front and back edges, color to match shelf faces.
         4) Exposed wall hung shelving, on four edges, color matching shelf faces.
   5. Self-Edge vertical grade high pressure plastic laminate edge banding at all other locations (custom plastic laminate casework, exposed shelf construction, and where indicated).
      a. Doors and drawers matching exposed faces.
      b. Cabinet bodies, spreaders, intermediate frames and rails matching exterior faces.
      c. Shelves behind solid doors on front and back edges, matching shelf faces.
      d. Exposed wall hung shelving on all four edges, matching shelf faces.
      e. Edges of other plastic laminate fabrications matching faces, unless indicated otherwise.
   6. Tolerances: Comply with Sections 400B-T-1 (except allowed tolerances shall not vary from unit to unit), 400B-T-2, 400B-T-3 and 400B-T-4 (except allowed tolerance for removal of color/pattern shall apply to semi-exposed edges and joints, no removal permitted on exposed edges and joints, edges and joints shall be machined flush and machine eased).
   7. Laminate Types by Application:
      a. Exposed horizontal surfaces: Horizontal grade.
         Vertical Grade: Exposed vertical surfaces including:
         1)Exposed faces of cases, doors and drawers.
         2)Exposed bottoms of wall cases, regardless of height.
         3)Exposed faces of fillers: Vertical grade.
         4)Exposed interiors of cases, including shelves (both sides).
         5)Exposed wall-hung shelves (both sides).
         6)Backs of glazed doors, solid doors and drawers. (match exposed faces of doors and drawers).

b. Melamine laminate: Semi-exposed surfaces of cases including:
   1) Shelves behind solid doors.
   2) Concealed sides and backs of cases.

B. **Core Type and Thickness:** Comply with Section 400-G-8, unless indicated otherwise.
1. Cabinet sides: Not less than 3/4 inch thick coreboard.
2. Spreaders or intermediate frames and rails : Not less than 3/4 inch thick coreboard.
3. Cabinet tops and bottoms: Not less than 3/4 inch thick coreboard.
4. Shelves:
   a. Open cabinets (all widths) and wall-hung shelving: 1 inch thick coreboard.
   b. Closed cabinets, spans up to 32 inches: 3/4 inch coreboard.
   c. Closed cabinets, spans over 42 inches: 1 inch thick coreboard.
5. Doors:
   a. 3/4 inch thick, unless otherwise indicated.
   b. 1 inch thick for doors over 80 inches high or 30 inches wide.
6. Drawer bodies:
   a. Sides and back: Not less than 1/2 inch medium density fiberboard.
   b. Subfront: Not less than 5/8 inch thick medium density fiberboard.
   c. Drawer bottom: Not less than 1/4 inch medium density fiberboard or 3/8 inch coreboard.
   d. Under-body stiffeners: Not less than 1/2 inch medium density fiberboard.

C. **Fillers:** Same construction as specified for cabinets, with matching edge finish. One-piece at top of wall cabinets for run of cabinets. Set flush with cabinet body (not flush with face of doors). Fillers at ends of wall cabinets to enclose gap at top, face and bottom.

D. **Cutouts:** Provide cutouts for plumbing fixtures, inserts, equipment, outlet boxes and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint seal contact surfaces of cutouts.

E. **Base System:** Ladder type, 3/4 inch thick exterior grade plywood, separate from cabinet body. Set back 3/4 inch at finished ends unless indicated otherwise, and 4 inches at toe space.

2.06 CASEWORK SURFACING AND EDGES

A. **Plastic Laminate Casework Surfacing:** Comply with the portions of Section 400B-S-1 of AWI Quality Standards as related to surfacing only; unless indicated otherwise.
1. Exposed faces of cases, doors and drawers: Vertical grade plastic laminate.
2. Exposed bottoms of wall cases, regardless of height: Vertical grade plastic laminate.
3. Exposed faces of fillers: Vertical grade plastic laminate, unless indicated otherwise.
4. Exposed interiors of cases, including shelves (both sides): Vertical grade plastic laminate.
5. Exposed wall-hung shelves (both sides): Vertical grade plastic laminate.
6. Exposed vertical surfaces of other plastic laminate fabrications: Vertical grade plastic laminate.
7. Exposed horizontal surfaces of other plastic laminate fabrications: Horizontal grade plastic laminate.
8. Semi-exposed surfaces of cases: Melamine laminate.
9. Backs of glazed doors, solid doors and drawers: Vertical grade plastic laminate matching exposed faces of doors and drawers.
10. Shelves behind solid doors: Melamine laminate both sides.
11. Concealed sides and backs of cases: Melamine laminate.

B. **Plastic laminate edge banding at custom casework:**
1. Doors and drawers: Self-edge with plastic laminate matching exposed faces.
2. Cabinet bodies, spreaders, intermediate frames and rails: Self-edge with plastic laminate matching exterior faces.
3. Shelves behind solid doors: Self-edge with plastic laminate on front and back edges, matching shelf faces.
4. Exposed wall hung shelving: Self-edge with plastic laminate on all four edges, matching shelf faces.
5. Edges of other plastic laminate fabrications: Vertical grade plastic laminate, matching faces, unless indicated otherwise.

2.07 CORES AND CORE THICKNESSES

A. **Type and Thickness:** Comply with Section 400-G-8, unless indicated otherwise.
   1. Cabinet sides: Not less than 3/4 inch thick coreboard.
   2. Spreaders or intermediate frames and rails : Not less than 3/4 inch thick coreboard.
   3. Cabinet tops and bottoms: Not less than 3/4 inch thick coreboard.
   4. Shelves:
      a. Open cabinets (all widths) and wall-hung shelving: 1 inch thick coreboard.
      b. Closed cabinets, spans up to 32 inches: 3/4 inch coreboard.
      c. Closed cabinets, spans over 42 inches: 1 inch thick coreboard.
   5. Doors: 3/4 inch thick, except for doors over 80 inches high or wider than 30 inches shall be 1 inch thick.
   6. Drawer bodies:
      a. Sides and back: Not less than 1/2 inch medium density fiberboard.
      b. Subfront: Not less than 5/8 inch thick medium density fiberboard.
      c. Drawer bottom: Not less than 1/4 inch medium density fiberboard or 3/8 inch coreboard.
      d. Under-body stiffeners: Not less than 1/2 inch medium density fiberboard.

2.08 OTHER COMPONENTS

A. **Fillers:** Same construction as specified for cabinets, with matching edge finish. One-piece at top of wall cabinets for run of cabinets. Set flush with cabinet body (not flush with face of doors). Fillers at ends of wall cabinets to enclose gap at top, face and bottom.

B. **Base System:** Ladder type, 3/4 inch thick exterior grade plywood, separate from cabinet body. Set back 3/4 inch at finished ends unless indicated otherwise, and 3 inches at toe space.

C. **Other Woodwork Fabrications:** As indicated.

2.09 WORKSURFACES FABRICATION

A. **Countertops:** Refer to Section 12 36 00, and Section 06 61 19.

2.010 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Drawer and Door Pulls: As indicated on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. **Verification of Conditions:** Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Do not proceed with Work until unsatisfactory conditions have been corrected.

B. **Ensure** that rough-in openings, built-in anchorage and reinforcing required for proper installation of Work are correctly sized, installed and located.

C. **Obtain** electrical and mechanical service characteristics and rough-in locations from site.

3.02 INSTALLATION

A. **Install** items to comply with manufacturer's instructions and with Section 1700 of AWI Quality Standards, for the Premium Quality Grade.
   1. Installation shall be by manufacturer or under manufacturer's supervision.

B. **Install** plumb, level, and without distortions. Where casework abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes at corners. Field scribe fillers as necessary to fit cabinets to walls, soffits, and floors.

C. **Anchor** casework securely in place with concealed fasteners, into structural support members of wall construction or ceilings. Comply with manufacturer's instructions for support of units.

D. **Provide** cutouts for item to be built into or passing through cabinets and work surfaces. Before making cutouts, drill pilot holes at corners.
   1. Seal edge of field installed cutouts as specified for factory installed cutouts under Factory Finish in Part 2 of this Section.

E. **Install** accessory materials to comply with each manufacturer's recommendations.

F. **Attach** countertops securely to base units. Spline and glue joints in countertops; provide mechanical clamping of joint. Scribe countertops to walls.

G. **Cut and drill** tops, backs sides or bottoms for service outlets and fixtures.

3.03 ADJUSTING AND CLEANING

A. **Adjust** doors, drawers, hardware, and other moving or operating parts to function smoothly and correctly.

B. **Clean** casework, counters, shelves, hardware, fittings, and accessories. Remove packaging and debris from site.

C. **Touch-up, repair, or remove and replace** defective Work as directed by the Architect.

END OF SECTION

SECTION 06 61 19

QUARTZ SURFACING COUNTERTOPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

A. Section includes quartz surfacing for:
   1. Countertops.

B. Related Sections include the following;
   1. Administrative, procedural and temporary work requirements.
   2. Division 6 section Rough Carpentry for blocking.
   3. Division 7 Section Joint Sealers.

1.03 REFERENCES

A. ASTM International:
   1. C97 Absorption and Bulk Specific Gravity of Dimension Stone.
   2. C99 Modulus of Rupture of Dimension Stone.
   3. C170 Compressive Strength of Dimension Stone.
   4. C370 Moisture Expansion.
   5. C501 Relative Resistance to Wear of Unglazed Tile to Taber Abraser.
   6. 6. C482 Bond Strength of Ceramic Tile to Portland Cement.
   7. C484 Thermal Shock Resistance of Grazed Ceramic Tile.
   8. C531 Linear Shrinkage and Coefficient of Thermal Expansion of Chemical - Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concrete.
   9. C648 Breaking Strength of Ceramic Tile.
   10. C1026 Resistance of Ceramic Tile to Freeze Thaw Cycling.
   11. C1028 Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
   12. E84 Surface Burning Characteristics of Building Materials.
   13. E662 Smoke Density.

B. American National Standards Institute (ANSI)
   1. ANSI Z124.6 Stain Resistance
   2. A108.5 Installation of Ceramic Tile with a Dry Set Portland Cement Mortar Latex Portland Cement Mortar.
   3. A108.10- Installation of Grout in Tilework.
   4. A118.4 - Latex-Portland Cement Mortar.
   5. A118.6- Ceramic Tile Grouts.
   6. A136.1- Lasers

1.04 SUBMITTALS

A. Product Data:
   1. Quartz Surfacing; Submit manufacturer's product data.
B. Samples:
   2. Submit (2) three inch x three inch quartz samples.
C. Shop Drawings:
   3. Drawings to include countertop layout, dimensions, required locations of support and blocking members, edge profiles, cutouts and attachments.

1.05 QUALITY ASSURANCE

A. Delivery, Storage and Handling:
   1. Packaging, Shipping, Handling and Unloading; Observe manufacturer's recommendations and handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.
B. Storage and Protection:
   1. Store in racks in near vertical position. Prevent warpage and breakage. Store Inside away from direct exposure to sunlight. Store between 25 and 130° F.

1.06 WARRANTY

A. Closeout Submittals:
   1. Provide manufacturer's completed warranty form.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Cambria.

2.02 MATERIALS

A. Material:
   1. Homogeneous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects.
B. Thickness:
   1. 3cm.
C. Identification:
   1. Material shall be labeled with manufacturer's identifying mark.
D. Color: As indicated on Drawings.
E. Finish: Polished.
F. Exposed Edges and Corners:
   1. Countertops profile: Square Eased Edges.
G. Performance:
   1. Moisture Absorption: typical results 0.02%; ASTM C97
   2. Modulus of Rupture: typical results 6,800 psi; ASTM C99
   3. Compressive Strength: typical results 24,750 psi; ASTM C170
   4. Moisture Expansion: typical results <0.01; ASTM C370
   5. Abrasion Resistance: typical results 223; ASTM C501
   6. Bond Strength: typical results 205 psi; ASTM C482
   7. Thermal Shock: passes 5 cycles: ASTM 484
   8. Coefficient of Thermal Expansion: typical results 1.2x10-5 inch/°F; ASTM C531
   9. Breaking Strength of Tile: typical results 3,661 lbf; ASTM C648
   10. Resistance to Freeze Thaw Cycling: unaffected 15 cycles; ASTM C1026
   11. Coefficient of Friction Pull Method: .75 avg. dry / .55 avg. wet; ASTM C1028
   12. Surface Burning Characteristics: typical results 17; ASTM E84

13. Smoke Density: flaming 196, non-flaming 69; ASTM E662
14. Stain Resistance: Unaffected; ANSI Z124.6

2.03 ACCESSORIES

A. Mounting Adhesive:
   1. Provide structural grade ’50 year’ silicone or epoxy adhesive as recommended by manufacturer.
B. Quartz Surface Adhesive:
   1. Provide epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use.
   2. Adhesive which will be visible in finished work shall be tinted to match quartz surface.
C. Joint Sealant:
   1. Clear sealant of type recommended by manufacturer for application and use.
   2. Provide anti-bacterial type in toilet, .
   3. Acceptable manufacturers:
      a. Dow Corning.
      b. GE Sealants.
D. Solvent: Denatured alcohol for cleaning quartz surfacing to assure adhesion of adhesives and sealants.
E. Cleaning Agents: Mild soap and water.

2.04 FABRICATION

A. Fabricator:
   1. Fabricator shall be by a certified Fabricator, certified in writing by
   2. Manufacturer.
B. Layout:
   1. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with ‘hairline’ joints.
C. Inspection of Materials:
   1. Inspect materials for defects prior to fabrication.
D. Tools: Cut and polish with water cooled powered tools.
E. Cutouts:
   1. Cutouts shall have a minimum of 3/8 inch (10mm) radius.
   2. Where edges of cutouts will be exposed in finished work; polish edges.
F. Laminations:
   1. Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.

PART 3- EXECUTION

3.01 INSTALLER

A. Installation shall be by a certified Installer, certified in writing by Manufacturer.

3.02 PRE-INSTALLATION EXAMINATION

A. Site Verification:
   1. Verify dimensions by field measurements prior to installation.
   2. Verify that substrates supporting quartz surfaces are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.
   3. [Base Cabinets shall be secured to adjoining units and back wall].

B. Inspection of Quartz Surfaces:
   1. Inspect materials for defects prior to installation.

3.03 PREPARATION

A. Prepare Surface:
   1. Clean surfaces prior to installation.

B. Protection of Quartz Surfaces:
   2. Protect finished surfaces from scratches. Apply masking where necessary. Take necessary precautions to prevent dirt grit dust and debris from other trades from contacting the surface.

3.04 INSTALLATION

A. Install materials in accordance with manufacturer's instructions and approved shop drawings.

B. Preliminary Installation:
   1. Position materials to verify the correct size.
   2. If size adjustments, or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water . Perform work away from installation site if possible.
   3. Allow gaps for expansion of not less than 1/8 inch(1.5mm) per ten feet when installed between walls or other fixed structure.

C. Permanent Installation:
   1. After verification of fit and finish, clean substrate; remove loose and foreign matter which may interfere with adhesion. Clean quartz surface backside & joints with denatured alcohol.
   2. Horizontal surface: Apply continuous bead of mounting adhesive around perimeter of structural substrate and supports.
   3. Vertical surface: Apply continuous bead of mounting adhesive around perimeter. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.
   4. Install quartz surfacing plumb, level, square and flat to within 1/8 inch in ten feet, non-cumulative.
   5. Align adjacent pieces in same plane.

D. Joints:
   1. Joints Between Adjacent Pieces of Quartz Surfacing:
      a. Joints shall be flush, tight fitting, level and neat.
      b. Securely join adjacent pieces with Cambria Two Part Acrylic Adhesive.
      c. Fill joints level to polished surface.
      d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.
   2. Joints Between Quartz Surface and back splash, wall:
      a. Seal joints with '50' year silicone sealant.

3.05 CLEANING

A. Remove masking, excessive adhesive and sealants. Clean exposed surfaces with denatured alcohol.

3.06 PROTECTION

A. Protect installed fabrications with non-staining sheet coverings.

END OF SECTION

SECTION 06 65 10

SOLID SURFACE FABRICATIONS

PART 1 — GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following horizontal and trim solid surface product types:
   1. Window sills.
   2. Countertops.

B. Related Sections include the following:
   1. Division 6 Section “Rough Carpentry” for Blocking.

1.03 DEFINITION

A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.04 SUBMITTALS

A. Product data:
   1. For each type of product indicated.

B. Shop drawings:
   1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
      a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
      c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

C. Samples:
   1. For each type of product indicated.
      a. Submit minimum 6-inch by 6-inch sample in specified gloss.
      b. Cut sample and seam together for representation of inconspicuous seam.
      c. Indicate full range of color and pattern variation.
   2. Approved samples will be retained as a standard for work.

D. Product data:
   1. Indicate product description, fabrication information and compliance with specified performance requirements.

E. Product certificates:
   1. For each type of product, signed by product manufacturer.

F. Manufacturer certificates:
   1. Signed by manufacturers certifying that they comply with requirements.

G. Maintenance data:
   1. Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.
      a. Maintenance kit for finishes shall be submitted.
   2. Include in project closeout documents.

1.05 QUALITY ASSURANCE

A. Qualifications:
1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Fabricator/installer qualifications:
1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

C. Applicable standards:
1. Standards of the following, as referenced herein:
a. American National Standards Institute (ANSI)
b. American Society for Testing and Materials (ASTM)
c. National Electrical Manufacturers Association (NEMA)
d. NSF International
2. Fire test response characteristics:
a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
1) Flame Spread Index: 25 or less.
2) Smoke Developed Index: 450 or less.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation.

B. Store components indoors prior to installation.

C. Handle materials to prevent damage to finished surfaces.
1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.07 WARRANTY

A. Provide manufacturer's warranty against defects in materials.
1. Warranty shall provide material and labor to repair or replace defective materials.
2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.

B. Manufacturer's warranty period:
1. Ten years from date of substantial completion.

1.08 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

PART 2 — PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
1. Subject to compliance with requirements, provide products by one of the following:
a. Wilsonart. (basis of design)
b. Corian® surfaces from the DuPont company.
b. Comparable products of other manufacturers.

2.02 MATERIALS

A. Solid polymer components
   1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
   2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.

B. Thickness: 1/2 inch.

C. Edge treatment: Eased edge.

D. Backsplash: Applied.

E. Sidesplash: Applied.

2.03 ACCESSORIES

A. Joint adhesive:
   1. Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

B. Sealant:
   1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

C. Sink/lavatory mounting hardware:
   1. Manufacturer's standard bowl clips, panel inserts and fasteners for attachment of undermount sinks/lavatories.

2.04 FACTORY FABRICATION

A. Shop assembly
   1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
   2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
      a. Reinforce with strip of solid polymer material, 2" wide.
   3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
   4. Rout and finish component edges with clean, sharp returns.
      a. Rout cutouts, radii and contours to template.
      b. Smooth edges.
      c. Repair or reject defective and inaccurate work.

2.05 FINISHES

A. Select from the manufacturer's standard color chart.
   1. Color: Refer to Drawings.

B. Finish:
   1. Provide surfaces with a uniform finish.
      a. Matte; gloss range of 5–20.

PART 3 — EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.02 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

1. Provide product in the largest pieces available.
2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
   a. Exposed joints/seams shall not be allowed.
3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
4. Cut and finish component edges with clean, sharp returns.
5. Rout radii and contours to template.
6. Anchor securely to base cabinets or other supports.
7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

B. Applied backsplashes and applied sidesplashes:

1. Install applied backsplashes and sidesplashes using manufacturer's standard color-matched silicone sealant.
2. Adhere applied backsplashes and sidesplashes to countertops using manufacturer's standard color-matched silicone sealant.

3.03 REPAIR

A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.04 CLEANING AND PROTECTION

A. Keep components clean during installation.

B. Remove adhesives, sealants and other stains.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Board insulation at perimeter foundation wall and underside of floor slabs.

B. Batt insulation in exterior wall construction and for sound attenuation.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-In-Place Concrete.

B. Section 05 40 00 - Cold-Formed Metal Framing: Supporting construction for batt insulation.

C. Section 09 21 16 - Gypsum Board Assemblies: Supporting construction for sound attenuation.

1.3 REFERENCE STANDARDS

A. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C.

1.4 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 if required.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.5 PRODUCT HANDLING

A. Storage Area: Provide suitable storage area for storage of materials and equipment.

B. Delivery: Deliver manufactured items to site in original sealed containers or packages bearing manufacturer's name and brand designation. Where specified, materials shall have UL labels or manufacturer's certification.

1.6 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Insulation materials are as listed.

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

2.2 RIGID BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation for Perimeter Insulation: ASTM C 578, Type IV; Extruded polystyrene board with cut cell surfaces; with the following characteristics:
   1. Board Size: 24 x 96 inch.

2. Board Thickness: 2 inches (R-10).
3. Board Edges: Square.
4. Compressive Resistance: 25 psi, minimum.
5. Board Density: 1.3 lb/cu ft.
6. Water Absorption, maximum: 0.3 percent, volume.
7. Flame/Smoke Properties: 15/165 in accordance with ASTM E 84.
8. Manufacturer: Dow Chemical - Styrofoam Brand, Square Edge.
9. Other Manufacturers:
   a. Owens Corning Corp.
   b. Pactiv Building Products.
10. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
   1. Combustibility: Non-combustible, when tested in accordance with ASTM E 84.
      a. Flame Spread Index: 25 or less.
      b. Smoke Developed Index: 50 or less.
   2. Thermal Resistance: R-21 minimum.
   3. Thickness: Fill stud cavity as indicated in Drawings.
   4. Facing: FSK-25.
   5. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Knauf Insulation GmbH: www.knaufinsulation.us.
      d. Owens Corning Corp: www.owenscorning.com.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Sound Attenuation: ASTM C 665; preformed batt; friction fit, conforming to the following:
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
   2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E 84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E 136, except for facing, if any.
   4. Thickness: 3-1/2 inches minimum.
   5. Facing: Unfaced.
   6. Manufacturers:
      a. CertainTeed Corporation: Sound Attenuation Batts (SAB) www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

A. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide.

B. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be mechanically fastened to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

C. 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 and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards:
   1. Three continuous beads per board length.

B. Install boards horizontally on foundation perimeter.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Install at all locations indicated on the Drawings. If not detailed, provide minimum 2 feet wide by 2 inch thick band continuous under perimeter of slabs on grade.

3.3 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.4 BATT INSTALLATION

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

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Install sound attenuation in accordance with manufacturer's instructions.

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

E. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

F. Tape insulation batts in place. Place so as not to allow sliding down in stud space.

3.5 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 24 00

EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Exterior insulation and finish system (EIFS) with secondary air and moisture barrier applied over exterior sheathing.
   2. Secondary air and moisture barrier behind exterior ACM and other veneer systems.

B. Related Items:
   1. Joint Sealants: refer to Section 07 90 05.
   2. Cold Formed Metal Framing: Refer to Section 05 40 00.
   3. Exterior Gypsum Sheathing: Refer to Section 09 21 16.

1.02 DEFINITIONS

A. Class PB Exterior Insulation and Finish system (EIFS) is defined by ASTM C 1397 as a "nonload bearing exterior wall cladding system that consists of an insulation board attached adhesively to the substrate; an integrally reinforce primer coat and a base coat; and a texture protective finish coat."

B. System refers to EIFS with a secondary moisture barrier.

C. System manufacturer refers to EIFS manufacturer.

1.03 PERFORMANCE REQUIREMENTS

A. General: Provide systems that comply with the following performance requirements:
   1. Bond Integrity: Free from bond failure within system components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
   2. Weathertightness: Resistant to water penetration from exterior into system and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of system and assemblies behind it, including substrates, supporting wall construction, and interior finish.

B. Physical Properties of E.I.F.S. System: Provide EIFS whose physical properties and structural performance comply with the following when tested per methods referenced:
   1. Abrasion Resistance: Sample consisting of 1-inch- (25.4 mm) thick EIFS mounted on ½-inch (12.7 mm) thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts (500 L) of sand when tested per ASTM D 968, Method A.
   2. Accelerated Weathering Characteristics: Sample of size suitable for test equipment and consisting of 1-inch (25.4 mm) thick EIFS mounted on 1/2 –inch (12.7 mm) thick gypsum board; cure for 28 days; and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 2000 hours when viewed under five times magnification per the following:
      a. Either ASTM G 23, Method 1 or ASTM G 53.
   3. Absorption-Freeze Resistance: No visible deleterious effect and negligible weight loss after 60 cycles per EIMA 101.01.
   4. Mildew Resistance: Sample consisting of finish coat applied to 2-by2-inch (50.8 by 50.8 mm) clean glass substrate; cured for 28 days; and showing no growth when tested per ASTM D 3273.
   5. Salt-Spray Resistance: Sample consisting of 1-inch (25.4 mm) thick EIFS mounted on ½-inch (12.7 mm) thick gypsum board; cured for 28 days and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 300 hours per ASTM B 117.
   6. Tensile Adhesion: No failure in the adhesive, base coat, or finish coat. Minimum 5-psi (34.5 kPa) tensile strength before and after freeze-thaw and accelerated weathering test per EIMA 101.03.
   7. Water Penetration: Sample consisting of 1-inch (25.4 mm) thick EIFS mounted on ½-inch (12.7 mm) thick gypsum board; cured for 28 days; and showing no water penetration into the plane of the base coat to expanded polystyrene board interface of the test specimen after 15 minutes at 6.24 ibf/sq.ft (299 Pa) of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.

8. Water Resistance: Sample consisting of 1-inch (25.4 mm) thick EIFS mounted on ½-inch (12.7 mm) thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.
9. Impact Resistance: Sample consisting of 1-inch (25.4 mm) thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following impact classification and range:
   a. High Impact Resistance: 90-150 inch-lb (10.2-17 J.)
10. Positive and Negative Wind-Load Performance: Sample assembly, 48 by 48 inches (1220 by 1220 mm) in size, consisting of studs, sheathing, and 1-inch (25.4 mm) thick EIFS; and showing capability to withstand wind loads normal to the plane of the wall of L/240 per ASTM E-330.

1.04 SUBMITTALS

A. Product Data: For each component of EIFS specified.

B. Shop Drawings: Show fabrication and installation of system including plans, elevations, sections, details of components, joint locations and configurations within system and between system and construction penetrating it, termination details, and attachments to construction behind system.

C. Samples for Initial Selection: Manufacturer's color charts and small-scale samples consisting of units or sections of units showing the full range of colors, textures, and patterns available for each finish choice indicated
   1. Submit sealant manufacturer's standard bead samples consisting of strips of actual products showing the full range of colors available.

D. Samples of Verification: 8 - 24-inch (600 mm) square panels for each finish, color, texture, and pattern specified. Prepare samples using same tools and techniques intended for actual work.
   1. Incorporate within each sample a typical control joint filled with sealant of color indicated or selected.

E. Installer Certificates: Signed by system manufacturer certifying that installers comply with specified requirements.

F. Installer proof of EIFS insurance: General liability insurance must include EIFS. If not a separate EIFS policy must be obtained.

G. Fabricator Certificates: Signed by system manufacturer certifying that panel fabricators comply with specified requirements on request, submit evidence of panel-fabricating experience.

H. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other information specified.
   1. Insulation.

I. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include joint sealant manufacturer's written interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.

J. Product Test Reports: Indicate compliance of proposed EIFS with physical property requirements specified in "Performance Requirements" Article based on comprehensive testing of current products by a qualified testing and inspecting agency.

K. Research/Evaluation Reports: Evidence of EIFS compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is certified in writing by system manufacturer as qualified to install manufacturers system in compliance with manufacturer's published specifications and details.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project, with a record of successful in-service performance, and is a member in good standing of the EIFS Industry Members Association (EIMA).

C. Fabricator Qualifications: Engage a firm experienced in producing panels similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Insulation Board Manufacturer Qualifications: Engage manufacturer recognized by system manufacturer as capable of producing insulation board compatible with system requirements, holding valid licensing agreement with system manufacturer, and complying with specifications and applicable local codes.

E. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548, and as required by local codes.

F. Source Limitations: Obtain materials for system from one source and by a single manufacturer or by manufacturers approved by EIFS manufacturer as compatible with other system components.

G. Fire-Test-Response Characteristics: Provide system assemblies and components with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
   1. Flame Spread of Insulation Board and Finish Coats: 25 or less when tested individually per ASTM E 84.
   2. Smoke Developed of Insulation Board and Finish Coats: 450 or less when tested individually per ASTM E. 84.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver Materials in original, unopened packages with manufacturer's labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
   1. Stack insulation board flat and off the ground.
   2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulation materials to Project site before installation time.
   3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not install system when ambient outdoor air and substrate temperatures are 40 deg F (4.4 deg C) and falling unless temporary protection and heat are provided to maintain ambient temperatures above 40 deg F (4.4 deg C) during installation of wet materials and until they have dried thoroughly and become weather resistant, but for at least 24 hours after installation.

1.08 COORDINATION AND SCHEDULING

A. Coordinate installation of EIFS with related Work Specified in other Sections to ensure that wall assemblies, including sheathing, flashing, trim, joint sealers, windows, doors, and other components penetrating system, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind EIFS.

B. Pre-installation Conference: Conduct conference prior to installation at Project site in accordance with the requirements of Section 01 30 00. Attendees shall include EIFS installer, EIFS manufacturer's representative, sealant installer, flashing installer, Architect, and Contractor.

1.09 WARRANTIES

A. Provide manufacturer's standard labor and material warranty for specified system.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide approved systems by one of the following:
   1. Sto Corp. – StoTherm ci Lotusan EIFS System.
   2. Comparable products of other manufacturers when approved by the Architect minimum 10 days prior to bid date.

2.02 MATERIALS

A. Compatibility: Provide substrates, adhesive, board insulation, reinforcing meshes, base and finish coat materials, sealants, and accessories that are compatible with one another and approved for use by system manufacturer for Project.

B. Color, Textures, and Patterns of Finish Coat: Comply with following requirements:
   1. Provide Architect's selections from system manufacturer's full range of colors, textures, and patterns for type of finish coat indicated.
   2. Finish Pattern: StoLit Lotusan 1.5 Medium Sand.
   3. Color: As indicated on Drawings.

C. Exterior Gypsum Sheathing Substrate: Glass mat faced exterior sheathing, 5/8 inch (15.9 mm) thick, complying with ASTM C1177. Refer to Section 09 21 16.

D. Fasteners for Exterior Sheathing: 1-5/8 inches (41 mm) No. 8 (4.2 mm-diameter) wafter-head steel drill screws complying with ASTM C 954, with an organic-polymer coating or other corrosion-protective coating having a salt-spray resistance of more than 500 hours per ASTM B 117.

E. Air and Moisture Barrier: System manufacturer's acrylic-based air and moisture barrier for sheathing consisting of the following:

   1. Trowel-or roll applied joint compound for rough opening protection, sheathing joints, and inside and outside corners.
   2. Reinforcing mesh or fabric for use with joint compound or air barrier coating.
   3. Roller applied waterproof coating for wall sheathing at correct published mil thickness.
   4. **This fluid applied air/moisture barrier shall extend to the substrate behind all ACM panels and other veneer systems**.
   5. Acceptable manufacturer and product:
      a. Sto Corp: Sto Guard Joint Treatment and Rough Opening Protection System.

F. Adhesive for Application of Insulation: System manufacturer's standard formulation designed for indicated use, compatible with substrate, and complying with the following requirements:

   1. Factory-blended dry formulation of Portland cement, dry polymer admixture, and fillers specified for base coat.
   2. Factory-mixed formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by system manufacturer.
   3. Acceptable manufacturer and product:
      a. Sto. Corp.: Sto BTS-Plus or BTS-Xtra

G. Molded-Polystyrene Board Insulation: Rigid, cellular thermal insulation formed by expansion of polystyrene resin beads or granules in a closed mold. Comply with system manufacturer's requirements, ASTM C 578 for Type I, and "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board" for more stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:
   1. Before cutting and shipping, age insulation in block form by air drying for not less than six weeks or by another method approved by EIMA that produces equivalent results.
   2. Provide insulation in boards not more than 24 by 48 inches (610 by 1219 mm) and in thickness indicated but not more than 4 inches (102 mm) or less than that allowed by ASTM PS 49.

H. Reinforcing Meshes:
   1. Standard Reinforcing Mesh: Not less than 4.5 oz/sq.yd. (136 g/sq.m).
   2. Detail Reinforcing Mesh: Not less than 4 oz./sq. yd. (136 g/sq. m)
   3. Corner Reinforcing Mesh: Not less than 7.2 oz/sq. yd (244 g/sq. m)

I. Pre-Fabricated Foam Shapes: Provide prefabricated, pre-base coated foam shapes as manufactured by an approved insulation manufacture as indicated on the Drawings.

J. Base Coat Materials: System manufacturer's standard mixture complying with the following requirements for materials composition and method of combining materials:
   1. Factory-blended dry formulation of Portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
   2. Acceptable manufacturer and product:
      a. Sto Corp.: Sto BTS Plus or Sto BTS-Xtra.

K. Waterproof Base Coat: System manufacturer's requirements for materials composition and method of combining materials:
   1. Factory-mixed, two component fiber reinforced, acrylic based, waterproof base coat with Portland cement.
   2. Install at projecting architectural trim and ledges per manufacturer's details and recommendations.
   3. Acceptable manufacturer and product:
      a. Sto Corp.: Sto Flexyl.

L. Primer: System manufacturer's standard factory-mixed elastomeric-polymer primer for preparing base-coat surface for application of finish coat. Primer tinted to match finish coat color.
   1. Acceptable manufacturer and product:
      a. Sto Corp.: Sto Primer smooth or textured

M. Finish-Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:
   1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
   2. Acceptable manufacturer and product:
      a. Sto Corp: StoLit Lotusan. 1.5 Medium Sand Texture.

N. Water: Clean and potable.

O. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with system manufacturer's written requirements.
   1. Starter Boards: Pre-applied base coat & mesh to insulation board with the required back-wrap termination. These boards are to be used at all system terminations.

2.03 ELASTOMERIC SEALANTS

A. Elastomeric Sealant Products: Provide system manufacturer's listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in "EIMA Guide for Use of Sealant with Exterior Insulation and Finish Systems, Class PB" and with requirements in Division 7 Section "Joint Sealants" for products corresponding to description indicted below:
   1. Low-modulus silicone sealant.

B. Sealant Color: Comply with the following requirements:
   1. Match finish-coat of system.

2.04 MIXING

A. General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

2.05 SOURCE QUALITY CONTROL

A. Owner will employ an independent testing and inspecting agency to perform shop tests and inspections and to prepare test reports.

1. Testing and inspecting agency will interpret tests and report whether tested Work complies with or deviates from requirements.

B. Correct deficiencies in or replace EIFS panels that inspections and test reports indicate do not comply with requirements.

C. Additional inspection and testing, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, area, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of system. Proceed with installation of system only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of systems. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect system, substrates, and wall construction behind them from inclement weather during installation. Prevent infiltration of moisture behind system and deterioration of substrates.

C. Prepare and clean substrates to comply with system manufacturers written requirements to obtain optimum bond between substrate and adhesive for insulation.

3.03 INSTALLATION

A. Comply with ASTM PS 49 and system manufacturers written instruction for installation of system as applicable to each type of substrate indicated.

B. Exterior Sheathing: Install on metal framing to comply with board manufacturer's written instructions. Install board with steel drill screws spaced no more than 8 inches (203 mm) o.c. along framing with perimeter fasteners at least 3/8 –inch (9.6 mm) but less than 5/8-inch (15.9 mm) from edges of boards. Fill all joints with Sto Gold Fill and Sto Detail Mesh.
   1. If required by local building code, install a layer of asphalt-saturated organic felt between exterior sheathing and studs.

C. Install air/moisture barrier over exterior sheathing known as "Sto Guard" or comparable products of other manufacturers. Maintain manufacturers recommended coverage on joint & exposed fasteners. Apply with spray equipment or roller per manufacturer's recommendations.

D. Apply trim accessories at perimeter of system, at expansion joints, and elsewhere, as indicated.

E. Attach insulation with adhesive to comply with ASTM PS 49, system manufacturer's written requirements, and the following:
   1. Use vertically notched adhesive to attach insulation to substrate by method complying with system manufacturer's written requirements.
   2. Install pre-fabricated, factory base coated, foam shapes over dry supporting substrate.
   3. Apply insulation boards over dry substrates in courses with long edges oriented horizontally. Begin first course from a level base line and work upward.
   4. Stagger vertical joints in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches (300 mm) wide or 6 inches (150 mm) high. Offset joints not less than 6-inches (150 mm) from corners of window and door openings.
      a. Offset joints insulation not less than 4-inches (100 mm) from horizontal joints in sheathing.
      b. Offset joints of insulation not less than 4-inches (100 mm) from aesthetic reveals.
   5. Interlock ends at internal and external corners.
   6. Abut boards tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between insulation boards. If gaps greater than 1/16-inch (1.6 mm) occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other materials.
   7. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicted.

8. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32-inch (0.8 mm) from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16-inch (1.6 mm).
9. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicted. Do not reduce insultion thickness at features to less than ¾-inch (19 mm).
10. Interrupt insulation for expansion joints where indicated.
11. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produces joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
12. At all terminations install pre-back wrapped starter boards.
13. Coordinate flashing installation with installation of insulation to produce a wall system that does not allow water to penetrate behind protective coating.

F. Install expansion joints at locations indicated, where indicated, where required by system manufacturer, and as follows:
1. Where expansion joints are indicated in substrates behind EIFS.
2. Where EIFS adjoins dissimilar substrates, materials and construction.
3. Where wall height changes.

G. Apply base coat to exposed surfaces of insulation in minimum thickness recommended in writing by system manufacturer, but not less than 1/16-inch (1.6 mm) dry-coat thickness. There should be no colored mesh visible. At locations of trim, reveals, aesthetic bands, sills or other architectural features that project beyond the vertical wall plane more than 2 inches, apply waterproof base coat with stainless steel trowel to the projecting sloped surface and minimum 4 inches above and below it.

H. Embed reinforcing mesh of type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 4-inch (100 mm) or otherwise treated at joints to comply with ASTM PS 49 and system manufacturer's written requirements. Do not lap reinforcing mesh within 8-inches (204 mm) of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
1. Intermediate reinforcing mesh where indicted.

I. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings extending 4-inches (100 mm) beyond perimeter. Apply additional 9-by-12-inch (230-by-305 mm) wide strip reinforcing mesh at both inside and outside corners, unless base layer of mesh is lapped not less than 4-inches (100 mm) on each side of corners.
1. At aesthetic reveals, apply strip-reinforcing mesh not less than 8-inches (200 mm) wide.
2. Embed strip-reinforcing mesh in base coat before applying first layer of reinforcing mesh.

J. Apply color coordinated primer evenly with brush, roller, or proper spray equipment over the clean, dry base coat, and allow to dry thoroughly before applying finish.

K. Apply finish coat over primed dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by system manufacturer to produce a uniform finish of color and texture matching approved samples.

3.04 INSTALLATION OF JOINT SEALANTS

A. Prepare joints and apply sealant of type and at locations indicated, to comply with applicable requirements in Division 7 Section "Joint Sealants" and in "EIMA Guide of Use of Sealants with Exterior Insulation and Finish Systems.
1. Clean surfaces to receive sealants to comply with indicated requirements and system manufacturer's written instructions.
2. Apply primer recommended in writing by sealant manufacturer for surface to be sealed.
3. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
4. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.
5. Recess sealant sufficiently from surface to system so an additional sealant application, including backing rod, can be installed without protruding beyond system surface.
6. Apply joint sealants after base coat has cured but before applying finish coat.

B. Joints shall be ½" max. around all windows exterior J-bodies, etc. and ¾" max at terminations between materials.

3.05 CLEANING AND PROTECTING

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and doorframes and other surfaces outside areas indicated to receive system coatings.

B. Provide final protection and maintain conditions, in a manner acceptable to Installer and system manufacturer, that ensure system is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 07 27 26

FLUID APPLIED MEMBRANE AIR AND MOISTURE BARRIERS

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 materials and installation of fluid applied air and moisture barrier membrane over vertical above grade wall sheathing behind all exterior wall cladding.

B. Related Requirements:

1. Section 03 30 00: Cast-In-Place Concrete
2. Section 04 22 00: Concrete Unit Masonry
3. Section 07 50 00: Membrane Roofing
4. Section 07 60 00: Flashing and Sheet Metal

1.3 DEFINITIONS

A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air Barrier Auxiliary Material: A transitional component that provides air barrier continuity furnished by a source other than the primary air barrier manufacturer.

D. Air Barrier Assembly: The collection of air barrier materials, accessory and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall

1.4 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference

1. Review air barrier installation requirements and installation details, mock-ups, testing requirements, protection, and sequencing of work.

1.5 REFERENCES

A. Building Code and Material Evaluation Service Standards

ICC ES AC 212	March, 2015, ICC Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing
2015, 2018 IBC	International Building Code
2015, 2018 IRC	International Residential Code

2015, 2018 IECC	International Energy Conservation Code

B. ASTM Standards

C297-94	Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
C1177-08	Specification for Glass Mat Gypsum Substrate for Use as Sheathing
D1970-00	Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
D3273-00	Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
D4541-09	Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
E84-98	Test Method for Surface Burning Characteristics of Building Materials
E96-00	Test Method for Water Vapor Transmission of Materials
E119-98	Standard Test Methods for Fire Tests of Building Construction and Materials
E331-00 (2016)	Standard Test Methods for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
E779-10	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
E783-02	Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
E1186-03 (2009)	Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
E1354-17	Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
E1827-96 (2007)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
E2178-03	Test Method for Air Permeance of Building Materials
E2357-05	Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
E2485/E2485M-13	Standard Test Method for Freeze/Thaw Resistance of EIFS and Water Resistive Barrier Coatings
E2570/E2570M-07	Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under EIFS or EIFS with Drainage

C. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

2005 ASHRAE	Handbook Fundamentals
ASHRAE 90.1	2016 Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE 189.1	2009 Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings

D. National Fire Protection Association (NFPA)

NFPA 285	Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

E. Sto Corp.

NFPA 285	NFPA 285 Wall System Compliance Directory
Installation	Sto RapidGuard Installation Guide
Installation	StoGuard Transition Membrane Installation Guide

1.6 COORDINATION/SCHEDULING

A. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.

B. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.

C. Provide sill flashing to direct water to the exterior before windows and doors are installed.

D. Install window and door head flashing immediately after windows and doors are installed.

E. Install diverter flashings wherever water can enter the assembly to direct water to the exterior.

F. Install parapet cap flashing and similar flashing at copings and sills to prevent water entry into the wall assembly.

G. Install cladding within 180 days of air and moisture barrier installation.

1.7 SUBMITTALS

A. Manufacturer’s specifications, details and product data.

B. Manufacturer’s standard warranty.

C. Manufacturer’s test report summary confirming compliance with the IBC, IRC, and IECC as an air barrier and water-resistive barrier.

D. Samples for approval as directed by architect or owner.

E. Shop drawings: substrate joints, cracks, flashing transitions, penetrations, corners, terminations, and tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

1.8 QUALITY ASSURANCE

A. Manufacturer requirements

1. Manufacturer of exterior wall air and moisture barrier materials for a minimum of 30 years in North America.
2. ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System

B. Contractor requirements

1. Knowledgeable in the proper use and handling of Sto materials.
2. Employ skilled mechanics who are experienced and knowledgeable in waterproofing and air barrier application, and familiar with the requirements of the specified work.

3. Provide the proper equipment, manpower and supervision on the job-site to install the air barrier assembly in compliance with the project plans & specifications, shop drawings, and Sto's published specifications and details.

C. Regulatory Compliance

1. Primary air barrier and joint treatment reinforcement materials:

a. Comply with ICC-ES AC 212 criteria for use on all types of construction.

b. Comply with VOC requirements of SCAQMD Rule 1113.

c. Comply with air barrier material requirements of ASHRAE 90.1 – 2016

d. Comply with air barrier material requirements of ASHRAE 189.1 – 2009

e. Comply with 2015, 2018 IRC requirements for a continuous air barrier

f. Comply with air barrier material requirements of 2015, 2018 IBC and IECC.

g. Comply with 2015 IBC par 1403.5 and 2018 par 1403.2 Exception for use on non-combustible construction with mass veneers for buildings over (or under) 40 feet (12.2m) in height.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store away from direct sunlight.

C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

D. Protect and store accessory and auxiliary products in accordance with manufacturer's written instructions.

1.10 PROJECT/SITE CONDITIONS

A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) during application and drying period, minimum 24 hours after application of air and moisture barrier materials.

B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C).

C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.11 WARRANTY

A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sto Corp.

B. Obtain primary air barrier and accessory air barrier materials from single source.

2.2 MATERIALS

A. Primary Air Barrier Material: StoGuard with Sto Gold Coat – ready-mixed flexible spray or roller applied air and moisture barrier material.

B. Accessory Materials

1. Sheathing Joint Treatments

   a. Sto RapidGuard™: one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other transitions in above grade wall construction

   b. Sto Gold Fill® with StoGuard Mesh: ready mixed coating applied by trowel or knife over nominal 4.2 oz/yd^2 (142 g/m^2) self-adhesive, flexible, symmetrical, interlaced glass fiber mesh.

   c. Sto Gold Coat® with StoGuard Fabric: flexible air and moisture barrier membrane material for embedding non-woven integrally reinforced cloth reinforcement.

2. Rough Opening Treatments

   a. Sto RapidGuard™: one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other transitions in above grade wall construction

   b. Sto Gold Coat with StoGuard Fabric and StoGuard Redicorner™: flexible air and moisture barrier membrane material with non-woven integrally reinforced cloth reinforcements. Also used as a detail component for shingle lap transition at flashing.

   c. Sto Gold Fill with StoGuard Mesh: ready mixed coating applied by trowel or knife with nominal 4.2 oz/yd^2 (142 g/m^2) self-adhesive, flexible, symmetrical, interlaced glass fiber mesh. Also used as a detail component for shingle lap transition at flashing.

   d. StoGuard Tape: self-adhered rubberized asphalt tape for frame walls with polyester fabric facing.

3. Transition Detail Components

   a. StoGuard Transition Membrane: flexible air and moisture barrier membrane for continuity at static transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, and shingle lap transitions to flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.

   b. Sto RapidGuard: one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap transition to

flashing, wall to balcony floor slab or ceiling, and through wall penetrations – pipes, electrical boxes, and scupper penetrations.

4. Primers

   a. StoGuard Primer: rubber resin emulsion primer for use with StoGuard Tape to enhance adhesion.

C. Auxiliary Materials

1. Wet sealant for static or dynamic transitions: Dow Corning 790, 791, and 795.
2. Pre-cured sealant tape for dynamic transitions: Dow 123.
3. Spray adhesive primer for rubberized asphalt tape: 3M Super 77 Spray Adhesive.
4. Spray foam gap filler: Dow Great Stuff for Gaps and Cracks.

2.3 PERFORMANCE REQUIREMENTS

A. Tensile Bond, freeze thaw, water resistance, water penetration resistance, durability and weathering: ASTM E2570, joint treatment and primary air barrier material meet Table 1 requirements

B. Nail sealability: ASTM D1970, primary air barrier passes

C. Resistance to mold: ASTM D3273, no mold growth after 28 day exposure

D. Adhesion: joint treatment and primary air barrier material, ASTM C297, $\geq$ 15 psi (105 kPa), or exceeds strength of glass mat facing on glass mat gypsum substrates

E. Surface burning: ASTM E84, joint treatment and primary air barrier material flame spread $\leq$ 25, smoke developed $\leq$ 450, Class A building material

F. Water vapor permeance: ASTM E96 Method B, > 10 perms (570 ng/Pa·s·m^2)

G. Field adhesion testing: ASTM D4541, $\geq$ 15 psi (105 kPA) or exceeds strength of glass mat facing on glass mat gypsum substrates

H. Fire resistance: ASTM E119, permitted for use in exterior walls of fire-resistance-rated construction assemblies.

I. Building envelope air leakage: ASTM E779 or 1827, $\leq$ 0.4 cfm/ft^2 (2 L/s·m^2)

J. Peak heat release rate, total heat release, effective heat of combustion: ASTM E1354, primary air barrier material less than PHR 150 kW/m^2, THR 20MJ/m^2, EHC 18 MJ/kg

K. Material air leakage: ASTM E2178, primary air barrier and joint treatment < 0.004 cfm/ft2 at 1.57 psf (0.02 L/s•m^2 at 75 Pa)

L. Assembly air leakage: ASTM E2357, $\leq$ 0.04 cfm/ft^2 (0.2 L/s·m^2) air leakage after conditioning protocol

M. Fire propagation: NFPA 285, meets requirements for use on all types of construction without height or setback limitations. (Refer to StoCorp NFPA 285 Wall System Compliance Directory)

N. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier material $\leq$ 50 g/L

O. Water-resistive barrier: ICC-ES AC 212, joint treatment and primary air barrier material comply.

2.4 DESIGN CRITERIA

A. Structural (Wind and Axial Loads)

1. Design for maximum allowable deflection normal to the plane of the wall: L/240. Where cladding dictates stiffer deflection criteria use cladding design criteria for maximum allowable deflection.

2. Design for wind load in conformance with code requirements.

B. Moisture Control

1. Prevent the accumulation of water in the wall assembly and behind the exterior wall cladding:

a. Minimize condensation within the assembly.

b. Drain water directly to the exterior where it is likely to penetrate components in the wall assembly (windows and doors, for example).

c. Provide corrosion resistant flashing to direct water to the exterior in accordance with code requirements, including: above window and door heads, beneath window and door sills, at roof/wall intersections, floor lines, decks, intersections of lower walls with higher walls, and at the base of the wall.

C. Air Barrier Continuity: provide continuous air barrier assembly of compatible air barrier components.

D. Substrates

1. Concrete Masonry Units: provide CMU surfaces in conformance with the applicable building code, and such that a void and pinhole free air barrier is achieved. Provide normal weight units with flush joints (struck flush with the surface) and allow for a minimum of 2 coats of the primary air barrier material, applied by spray or roller. Alternatively, for “rough” CMU wall surfaces allow for a cementitious parge coat to fill and level irregular surfaces, prior to 1 coat of the primary air barrier material.

2. Concrete: provide concrete in conformance with the applicable building code.

3. Sheathing: provide gypsum sheathing in compliance with ASTM C1177, provide APA Exterior or Exposure 1 wood-based sheathing, and provide sheathing that meets required design wind pressures.

E. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2005 ASHRAE Handbook—Fundamentals).

PART 3 PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect concrete and concrete masonry surfaces for:

1. Contamination – algae, dirt, dust, efflorescence, form oil, fungus, grease, mildew or other foreign substances.

2. Surface deficiencies – weak, friable, chalkiness, laitance, bugholes, and spalls.

3. Cracks – measure crack width and record location of cracks.
4. Damage or deterioration.
5. Moisture content and moisture damage – use a moisture meter to determine if the surface is dry enough to receive the waterproof air barrier and record any areas of moisture damage or excess moisture.
6. Flush masonry mortar joints completely filled with mortar.

B. Inspect sheathing application for compliance with applicable requirement:
1. Exterior Grade and Exposure I wood based sheathing: E30U-2007, Engineered Wood Construction Guide, and the requirements of the applicable building code.
2. Glass mat faced gypsum sheathing in compliance with ASTM C1177: consult manufacturer's published recommendations and ICC-ES Report. Conform with project requirements for wind load resistance.
3. Cementitious sheathing – Consult manufacturer's published recommendations and ICC-ES Report. Conform with project requirements for wind load resistance.

C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the air and moisture barrier installation. Do not start work until deviations are corrected.

3.2 SURFACE PREPARATION

A. Sheathing
1. Remove and replace damaged sheathing.
2. Spot surface defects such as over-driven fasteners, knot holes, or other voids in sheathing with knife grade joint treatment material.
3. Spot fasteners with knife grade or coating joint treatment material.

3.3 INSTALLATION

A. Coordinate work with other trades to ensure air barrier continuity with connections at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.

B. Transition Detailing: detail transition areas with Sto RapidGuard or StoGuard Transition Membrane to achieve air barrier continuity. For illustrations of installation, refer to Sto Guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide (www.stocorp.com).

C. Rough opening protection
1. Install rough opening protection. Refer to Sto details and applicable Sto product bulletins.

D. Sheathing joints
1. Install joint treatment material over sheathing joints. Refer to Sto details and applicable Sto product bulletins.

E. Air and moisture barrier coating
1. Sheathing

a. Glass mat faced gypsum sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10-12 wet mils to the prepared substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.

b. Plywood sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10-12 wet mils to the prepared substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.

c. OSB sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10-12 wet mils to the prepared substrate to achieve a void and pinhole free surface. Allow to dry and touch up any areas with raised wood strands or other defects to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.

3.4 FIELD QUALITY CONTROL

A. Owner's qualified testing agency or building envelope consultant shall perform inspections and tests.

B. Inspections: air barrier materials are subject to inspection to verify compliance with requirements.

1. Condition of substrates and substrate preparation.

2. Installation of primary air barrier material, accessory materials, and compatible auxiliary materials over structurally sound substrates and in conformance with architectural design details, contractor's shop drawings, project mock-up, and manufacturer's written installation instructions.

3. Air barrier continuity and connections without gaps and holes at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.

C. Tests: air barrier materials and assembly are subject to tests to verify compliance with performance requirements:

1. Qualitative air leakage test: ASTM E1186

2. Quantitative air leakage test: ASTM E779, E783, and E1827

3. Adhesion test: ASTM D4541

4. Qualitative adhesion and compatibility testing: wet sealant manufacturer's field quality control adhesion test

D. Repair non-conforming substrates and air barrier material installation to conform with project requirements.

E. Take corrective action to repair and replace, reinstall, seal openings, gaps, or other sources of air leakage to conform with project performance requirements.

3.5 PROTECTION AND CLEANING

A. Protect air barrier materials from damage during construction caused by wind, rain, freezing, continuous high humidity, or prolonged exposure to sun light.

B. Protect air barrier materials from damage from trades, vandals, and water infiltration during construction.

C. Repair damaged materials to meet project specification requirements.

D. Clean spills, stains, soiling from finishes or other construction materials that will be exposed in the completed work with compatible cleaners.

E. Remove all masking materials after work is completed.

END OF SECTION

SECTION 07 42 13

METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concealed fastener metal wall panels as part of the assembly described in Section 2.1.

1.2 RELATED REQUIREMENTS

A. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal copings, flashings, reglets and roof drainage items.

B. Division 07 Section "Joint Sealants" for field-applied joint sealants.

C. Division 07 Section “Air Barriers” for transition and flashing componets of air/moisture barrier.

D. American Architectural Manufacturer's Association (AAMA):

1. AAMA 621 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.

E. American Society of Civil Engineers (ASCE):

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

F. ASTM International (ASTM):

1. ASTM A 653/A 653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
3. ASTM A 755/A 755M - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
4. ASTM A 792/A 792 M - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
5. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate.
6. ASTM C 754 - Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
7. ASTM C 920 - Specification for Elastomeric Joint Sealants.
8. ASTM C 1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
9. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
10. ASTM E 283 - Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
11. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

G. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):

1. Architectural Sheet Metal Manual.

1.3 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

1.4 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10 years experience in manufacture of similar products in successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.
b. Load span tables including evaluation of panel clip and panel side joint interaction.
c. Samples of each component.
d. Project references: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
e. Sample warranty.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
3. Approved manufacturers must meet separate requirements of Submittals Article.

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

1.5 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's representative, and other trade contractors.

1. Coordinate building framing in relation to metal wall panel assembly.
2. Coordinate installation of building air and water barrier behind metal wall panel assembly.
3. Coordinate window, door and louver, and other openings and penetrations of metal wall panel assembly.

1.6 ACTION SUBMITTALS

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

1. Include data indicating compliance with performance requirements.

B. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized Installer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale of 1-1/2-inch per foot (1:8) of all required trim and extrusions needed for a complete installation.

1. Indicate points of supporting structure that must coordinate with metal wall panel assembly installation.
2. Indicate details of fastening, including clip spacing, supported by load span tables that include an evaluation of clip and panel side joint interaction.

C. Samples for Verification: Provide 12-inch (300 mm) section of panel(s) showing finishes. Provide 12-inch (300 mm) long pieces of trim pieces and other exposed components.

1.7 INFORMATIONAL SUBMITTALS

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

B. Manufacturer's warranty: Submit sample warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect metal wall panel products during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.

1. Deliver, unload, store, and erect metal wall panel products and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

1.10 WARRANTY

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

B. Special Panel Finish Warranty: On manufacturer’s standard form, in which manufacturer agrees to repair or replace metal wall panels that display evidence of deterioration of finish within 20 years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. **Metal Wall Panels over Multi-Component Framed Wall System**: Single-skin concealed fastener metal wall panels applied as exterior rainscreen cladding over wall framing specified in Division 05 Section "Cold-Formed Metal Framing" with exterior sheathing specified in Division 06 Section "Sheathing", an applied membrane that provides air, moisture, and water vapor control specified in Division 07 Section "Air Barriers", and insulation within the framing specified

in Division 07 Section "Thermal Insulation". Metal wall panel installation specified in this Section includes secondary metal subgirt framing and mounting clips for panel attachment.

1. Air, moisture, and water vapor control membrane is provided under Division 07 Section "Air Barriers."

2.2 MANUFACTURERS

A. Basis of Design: **CENTRIA, Concept Series Metal Wall Panels**. Provide basis of design product, or comparable product approved by Architect prior to bid**]**.

1. CENTRIA Architectural Systems; Moon Township, PA 15108-2944. Tel: (800)759-7474. Tel: (412)299-8000. Fax: (412)299-8317. Email: info@CENTRIA.com. Web: www.CENTRIA.com.

2.3 PANEL MATERIALS

A. **Metallic-Coated Steel Face Sheet:** Coil-coated, ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Class Z275), structural steel.
2. Face Sheet: Minimum 0.036 inch/20 gage (0.91 mm) nominal uncoated thickness.
3. Surface: Smooth.

2.4 CONCEALED FASTENER METAL WALL PANELS

A. Metal Wall Panels, General: Factory-formed, concealed fastener panels with interconnecting side joints, fastened to supports with concealed fasteners, with factory-applied sealant in side laps when required to meet performance requirements.

B. Double-reveal profile with raised flat pan and rib:

1. Basis of Design Product: **CENTRIA, CS-210**.
2. Panel Coverage: 12 inches (305 mm).
3. Panel Height: 0.875 inch (22 mm).

C. Double-reveal profile with raised flat pan and rib:

1. Basis of Design Product: **CENTRIA, CS-220**.
2. Panel Coverage: 12 inches (305 mm).
3. Panel Height: 0.875 inch (22 mm).

D. Three-rib Profile:

1. Basis of Design Product: **CENTRIA, CS-260**.
2. Panel Coverage: 12 inches (305 mm).
3. Panel Height: 0.875 inch (22 mm).

E. Exposed Coil-Coated Finish System:

1. Fluoropolymer Two-Coat System: 0.2 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.

a. Basis of Design: **CENTRIA Fluorofinish**.

F. Color:

1. Exterior Surface: As indicated in Drawings.
2. Interior Surface: Manufacturer's standard primer color.

2.5 METAL WALL PANEL ACCESSORIES

A. Extruded Trim: Manufacturer's complementary aluminum extrusions for head, jamb, sill, base, flush, reveal, inside and outside corner, endwall, and expansion joint details. Finish to match metal wall panels.

1. Basis of Design: **CENTRIA, Microline Extrusions**.

B. Formed Flashing and Trim: Match material, thickness, and color of metal wall panel face sheets.

C. Sealants: Type recommended by metal wall panel manufacturer for application, meeting requirements of Division 07 Section "Joint Sealants."

D. Flashing Tape: 4-inch wide self-adhering butyl flashing tape.

E. Fasteners, General: Self-tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. Where exposed fasteners cannot be avoided for miscellaneous applications, supply corrosion-resistant fasteners with heads matching color of metal wall panels by means factory-applied coating.

F. Concealed Clips: Galvanized steel, 0.06 inch/16 ga. (1.52 mm) nominal thickness, designed to allow unimpeded thermal movement of panel and configured to hold panel minimum 1/2 inch (12.7 mm) from substrate.

2.6 SECONDARY METAL SUBGIRT FRAMING

A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180).

1. Hat Channels: 0.06 inch/16 ga. (1.52 mm) minimum – nominal thickness.
2. Sill Channels: 0.06 inch/16 ga. (1.52 mm) minimum – nominal thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine metal wall panel substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal wall panels.

B. Wall Substrate: Confirm that wall substrate is within tolerances acceptable to metal wall panel system manufacturer.

1. Maximum deviations acceptable:

a. 1/4-inch in 20 feet (6.4 mm in 6 m) vertically or horizontally from face plane of framing.
b. 1/2-inch (12.7 mm) across building elevation.
c. 1/8-inch in 5 feet (3.2 mm in 1.5 m).

C. **Framing**: Inspect framing that will support metal wall panels to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal wall panels.

D. **Air/Moisture Barriers**: Confirm that work has been completed, inspected, and tested as required.

E. Advise G.C., in writing, of out-of-tolerance work and other deficient conditions prior to proceeding with metal wall panel system installation.

F. Correct out of tolerance work and other deficient conditions prior to proceeding with insulated composite backup panel installation.

3.2 SECONDARY FRAMING INSTALLATION

A. Secondary Metal Framing: Install secondary metal framing components to tolerances indicated, as shown on approved shop drawings. Install secondary metal framing and other metal panel supports per ASTM C 1007 and metal wall panel manufacturer's recommendations.

3.3 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in accordance with approved shop drawings and manufacturer's recommendations. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place. Provide for thermal and structural movement

B. Attach panels to metal framing using recommended clips, screws, fasteners, sealants, and adhesives indicated on approved shop drawings.

1. Fasteners for Steel Wall Panels: Stainless-steel for exterior locations and locations exposed to moisture; carbon steel for interior use only.
2. Fasten metal wall panels to supports with concealed clips at each joint at location, spacing, and with fasteners recommended by manufacturer. Install clips to supports with self-tapping fasteners.
3. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
4. Dissimilar Materials: Where elements of metal wall panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Joint Sealers: Install joint sealants where indicated on approved shop drawings.

3.4 ACCESSORY INSTALLATION

A. General: Install metal wall panel accessories with positive anchorage to building and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install related flashings and sheet metal trim per requirements of Division 07 Section "Sheet Metal Flashing and Trim."
2. Install components required for a complete metal wall panel assembly, including trim, copings, corners, lap strips, flashings, sealants, fillers, closure strips, and similar items.
3. Comply with performance requirements and manufacturer's written installation instructions.
4. Provide concealed fasteners except where noted on approved shop drawings.
5. Set units true to line and level as indicated.

3.5 CLEANING AND PROTECTION

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

B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

END OF SECTION

SECTION 07 42 64

ALUMINUM COMPOSITE WALL PANELS

PART 1 GENERAL

1.01 SCOPE

A. The extent of panel system work is indicated on the drawings and as specified herein. specifications. In the event of discrepancy between architectural drawings and specifications, the specifications will dictate.

B. Panel system requirements include the following components: Aluminum faced composite panels with mounting system. Panel mounting system including specified vapor permeable air and water barrier, anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and masking (as required) for a complete installation.

1.02 QUALITY ASSURANCE

A. Aluminum Composite Material (ACM) Manufacturer shall have a minimum of 10 years experience in the manufacturing of this product.

B. ACM Manufacturer shall be solely responsible for panel manufacture and application of the finish.

C. Fabricator and Installer shall be acceptable to the composite panel manufacturer.

D. A Project Manager shall be assigned by the Fabricator/Installer to the project and provide continuous management of all submittals, engineering, shop drawings, material procurement, fabrication, jobsite coordination and installation.

E. Project schedules shall be provided by the Fabricator/Installer at the time contract is awarded. This schedule is to be updated through-out the construction process.

F. A jobsite Superintendent shall be assigned by the Fabricator/Installer to the project and will make jobsite visits to insure General Contractor is installing substrate and sheathing correctly. It is imperative that the substrate is plumb, level and string-line straight. Superintendent shall also verify that the substrate dimensions match the metal wall panel engineered shop drawings.

G. Field measurements shall be taken prior to the completion of shop fabrication whenever possible. Fabricator/Installer shall coordinate fabrication schedule with construction progress, as directed by the Contractor, to avoid delay of work. Field fabrication may be allowed to ensure proper fit; however, field fabrication shall be kept to an absolute minimum with the majority of the fabrication being done under controlled shop conditions.

H. Flatness Criteria of the installed panel system: maximum of 1/4” in 20'-0” on panel in any direction.

I. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited, to the vapor-permeable air and water barrier, attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.

J. Prior to installation of panel system, the fabricator/installer shall apply an approved vapor-permeable air and water barrier over the building sheathing, as well as verify the type of sheathing to determine compatibility of panel system fasteners. It is the responsibility of the fabricator/installer to coordinate this with the General Contractor.

1.03 RELATED SECTIONS

A. Related Sections include the following:
   1. Division 05 Section “Cold-Formed Metal Framing” for secondary support framing supporting metal wall panels.
   2. Division 07 Section “Fluid Applied Air and Water Barriers
   3. Division 07 Section “Flashings” for perimeter openings related to metal wall panels.
   3. Division 07 Section “Sealants” for perimeter and non-exposed system sealants.
   4. Division 08 Section “Curtain wall” for perimeter openings related to metal wall panels.

1.04 SUBMITTALS

A. Samples:
   1. Two samples of each color or finish selected, 3” x 4” minimum.
   2. Two samples of vapor-permeable air and water barrier

B. Shop Drawings:
   1. Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.

C. Code Compliance:
   1. Documents showing product compliance with the national and local building code shall be submitted prior to the bid.

D. Test Reports: Submit certified test reports which meet or exceed the requirements as described in the Testing Section 2.04. The test report shall include the following,
   1. Name and location of the certified independent testing laboratory with the contact phone numbers.
   2. Unit description and system name of the panel system tested. Include the test drawings with elevations with details showing the tested panel joinery.

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect finish and edges in accordance with panel manufacturer's recommendations.

B. Store material in accordance with panel manufacturer's recommendations.

C. After acceptance of panels on a given elevation, protection shall be the responsibility of the General Contractor.

1.06 WARRANTY

A. Provide manufacturer’s 10 year panel warranty and 30 year finish warranty.

PART 2 PRODUCTS

2.01 PANELS

A. Composition:
   1. Two sheets of aluminum, sandwiching a solid core of extruded thermoplastic material, formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.
   2. Approved Manufacturers - NO SUBSTITUTIONS:
      a. Alcoa Architectural Products - Reynobond, (800-841-7774)
      b. Mitsubishi Chemical FP America- Alpolic (800-422-7270)

B. Thickness: 4MM (0.157”)

C. Product Performance:
   1. Bond Integrity:
      a. When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following minimum values:
      b. Peel Strength: 100 N·mm/mm (22.5 in·lb/in) as manufactured
      c. 100 N·mm/mm (22.5 in·lb/in) after 8 hours in water at 200°F (93°C)
      d. 100 N·mm/mm (22.5 in·lb/in) after 21 days soaking in water at 70°F (21°C)

D. Finishes:
   1. Finishes shall be coil coated FEVE, PVDF resin, paint system or equivalent to provide a ten (10) year warranty. Finishes to be a 2 coat system. All manufactured paint samples or paint system changes shall be submitted for approval and signed off by the Architect prior to manufacture.
      a. Locations: As indicated on Drawings.
   2. Coating Thickness:
      a. 2 coat finish: .2-.4 primer, .7-.9 color, total 1.0 mil (± 0.1 mil), 25.4 µm (± 2.5 µm)
   3. Hardness: ASTM D 3363; HB minimum using Eagle Turquoise Pencil.
   4. Impact:
      a. Test method: ASTM D 2794; Gardner Variable Impact Tester with 5/8” (15.9mm) mandrel.
      b. Coating shall withstand reverse impact of 1.5 in·lb per mil substrate thickness (0.681 m·kg per mm substrate).
      c. Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
   5. Adhesion:
      a. Test Method: ASTM D 3359.
      b. Coating shall not pick off when subjected to a grid of 11 cuts x 11 cuts, 1/16” apart, and taped with #600 Scotch Tape.
   6. Humidity Resistance:
      a. Test Method: Expose the sample in a controlled heat and humidity cabinet for 4000 hours at 38 degrees C (100 degrees F) and 100% RH with the cabinet operated in accordance with ASTM D 2247.
      b. No formation of blisters to extent greater than "Few" blisters Size No.8 as shown in Figure 4, ASTM D 714.
   7. Salt Spray Resistance:
      a. Test Method: ASTM B 117; Expose coating system to 4000 hours, using 5% NaCl solution.
      b. Corrosion creepage from scribe line: 1/16” max. (1.6mm).
      c. Minimum blister rating of 8 within the test specimen field.
   8. Weather Exposure:
      a. Outdoor:
         1) In accordance with the parameters of the South Florida Testing, ten-year exposure at 45° angle facing south Florida exposure.
         2) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D 2244.
         3) Maximum chalk rating of 8 in accordance with ASTM D 4214.

2.02 SYSTEM DESCRIPTION

A. Provide a Rout and Return Dry Joint panel system, as detailed on the drawings. Any panel system utilizing a continuous field applied joint sealant is unacceptable. Exposed sealant in the 4-way joints is unacceptable.

B. The panel system, as detailed, shall consist of perimeter extrusions, extruded stiffeners, fasteners and may consist of related flashings (where architectural drawings indicate they are to be furnished under this specification section), sealants between jamb panels and previously installed adjacent construction, and other miscellaneous accessories required for a complete

watertight installation. Assembly shall meet the air and water infiltration requirements in section 2.04 of this specification.

C. Commercial grade fluid applied vapor-permeable air and water barrier shall be installed by the Fabricator / Installer per manufacturer's specification. All edges must be sealed to adjacent perimeter conditions for an airtight fit.
   1. Approved Program Manufacturers
      a. Sto Corp.
      b. Product: Gold Coat; refer to Section 07 27 26.

2.03 COMPOSITE PANEL SYSTEM

A. Panel System: The panel system shall consist of ACM provided by one of the approved program vendors and a system of custom aluminum extrusions of size and shape indicated on the Architect of Record's drawings and as specified herein. The panel system shall conform to all of the following,
   1. Perimeter Extrusions: Mill extruded aluminum, as detailed on drawings, so as to provide the following essential features,
      a. Rout and return the ACM panels on all perimeters. "Continuous Edge Grip" (CEG) is not acceptable.
      b. Maximum overall panel thickness, including the attachment shim space, shall not exceed 2 1/2".
   2. Stiffeners: Extruded aluminum sections secured to edge trim and bonded to rear face of ACM panels with silicone, and of sufficient size and strength to maintain flatness of the panel within the specified tolerances.
   3. Reveals at Panel: Joint size between the faces of the perimeter extrusions shall be ¾" nominal, painted to match adjoining panels.
   4. Flatness Criteria: Maximum 1/8" in 5'-0" on panel in any direction for assembled units (non-accumulative) and ¼" in 20'-0" (accumulative).

B. Code Performance Requirements: Work of the section shall conform to all applicable codes and regulations.
   1. Thermal Design Criteria:
      a. Make allowances for free and noiseless vertical and horizontal thermal movement due to the contraction and expansion of component parts, for an ambient temperature range from -20 degrees F to +180 degrees F. Buckling of panels, separation/opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement of component parts will not be permitted. Fabrication, assembly and erection procedure shall take into account the ambient temperature range at the time of the respective operation.
   2. Fire Performance Characteristics:
      a. Flame spread index of 25 maximum, and Smoke developed index of 450 maximum in accordance with ASTM E84.
   3. Wind Loads:
      a. Assemblies herein specified shall be designed for flexural, shear and torsional stresses for the following positive and negative wind pressures acting normal to the plane of the assemblies. Loading design shall; be based on latest applicable Building Code but in no case less than 20 pounds per square foot with 25 pounds per square foot corner pressure.
   4. Material Stress and Deflection:
      a. Normal to the plane of the wall between structural supports, deflection of the attached perimeter-framing members shall not exceed L/175 of span length or ¾", whichever is less.
      b. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1/16". Where connection points are not clearly defined, maximum anchor deflection shall not exceed 1/16".
      c. Stresses must take into account interaction and in no case shall allowable values exceed the yield stress.
      d. At 1.5 times design pressure, permanent deflections of framing members must not exceed L/100 of the span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors,

permanent set shall not exceed 1/16".

2.04 TESTING

A. Wall System Performance: Panel system furnished under this section shall have been tested. If comparable tests are not available, mockups shall be constructed and tests performed. In either case, an independent laboratory approved by the Architect of Record shall conduct the tests. Test results shall meet or exceed the following.
   1. Air Infiltration:
      a. When tested in accordance with ASTM E283, the air infiltration at 6.24 psf must not exceed 0.06 cfm per square foot of wall area.
   2. Static Water Infiltration:
      a. When tested at a differential static pressure of 12.0 psf for 15 minutes, in accordance with ASTM E331, any uncontrolled water passing into the room-side beyond the interior barrier of the wall system shall not be permitted. The panel system shall be designed to provide controlled drainage to the exterior face of the wall for any leakage of water occurring at joints and/or condensation taking place within the wall system.
   3. Structural Performance:
      a. Shall be tested in accordance with ASTM E330 at design pressure. Deflection limitations are listed previously. After initial test, test at 150% of design pressure; no permanent deformation exceeding L/100 or failure to structural members allowed.

B. Bond Integrity Test for ACM: In accordance with ASTM D 1781-76 for bond integrity, simulating resistance to delaminating (No other test procedure is acceptable):
   1. Peel strength: 22.5 in lb/in (min)

PART 3 EXECUTION

3.01 INSTALLERS' EXAMINATION

A. Examine substrates, areas and conditions for compliance with requirements for installation tolerances, metal wall panel supports, approved vapor-permeable air and water barrier and other conditions affecting performance of work.
   1. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
   2. Verify approved vapor-permeable air and water barrier is installed correctly prior to installation of ACM system.
   3. For the record, prepare written report, endorsed by Fabricator/Installer, listing conditions detrimental to performance of work.

B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.

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

3.02 ALUMINUM COMPOSITE WALL PANEL INSTALLATION

A. General: Install attachment system required to support wall panels and to provide a complete weathertight wall system, including approved vapor-permeable air and water barrier, perimeter extrusions, tracks, drainage channels, panel clips and anchor channels.
   1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar material joinery and panel-system joint seals.
   2. Do not begin installation until approved vapor-permeable air and water barrier and flashings that will be concealed by composite panels are installed.
   3. Panels shall be erected in accordance with an approved set of shop drawings.
   4. Anchor panels, securely per engineering recommendations and in accordance with approved shop drawings to all for necessary thermal movement and structural support.
   5. Conform to panel fabricator's instruction for installation of concealed fasteners.
   6. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraised and broken members.

7. Do not cut, trim, weld or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for refabrication, if possible, or for replacement with new parts.

3.03 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal wall panel assembly including approved vapor-permeable air and water barrier, trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions and SMACNA's “Architectural Sheet Metal Manual”. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, bucking and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Fabricate flashing materials from .040 minimum thickness aluminum sheet painted to match the adjacent curtain wall/panel system where exposed.
   3. Expansion Provisions: provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3meters) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant or waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.04 CLEANING AND PROTECTION

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

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt and sealant.

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 54 00

FULLY ADHERED THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, adhered conventional application including membrane, flashing and accessories.

B. Insulation, flat and tapered.

C. Flashings.

D. Roofing stack boots and walkway pads.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Counter flashings, scuppers, reglets, and coping.

C. Section 07 90 05 - Joint Sealants.

D. Division 22 - Plumbing Specialties: Roof drains.

1.03 REFERENCES

A. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

B. ASTM D 4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.

C. FM DS 1-28 - Insulated Steel Deck Construction; Factory Mutual Research Corporation.

D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association.

E. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc..

1.04 SUBMITTALS

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

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and membrane adhesive.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.

D. Insulation Layout: Provide tapered insulation drawings.

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

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Applicator Qualifications: Company specializing in performing the work of this section with crew foreman with minimum three years experience. Submit manufacturer's certification for Contractor.

1.06 PRE-INSTALLATION MEETING

A. Immediately prior to the installation of the finish roof, the Roofing Contractor shall conduct an onsite inspection of the structural deck in the company of the Contractor. The Roofing Contractor will verify roof slopes between drain, proper surface and dryness of concrete decks, attachment of wood nailers and blocking, and approve the proposed method of storage materials.

B. Not later than 30 days prior to the scheduled pre-roofing job site conference, the Contractor shall submit to the Architect/Engineer a complete list of roofing materials to be used on project with shop drawings of details including any proposed modifications of details by Contractor. Materials shall meet all project specification requirements.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect roof structure from excess loading.

D. Protect foam insulation from direct exposure to sunlight.

1.08 PROJECT CONDITIONS

A. Coordinate the work with installation of associated counter flashings installed by other sections as the work of this section proceeds.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

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.

1.10 WARRANTY

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

B. Prior to the request for final payment, the Manufacturer shall furnish a written warranty of the roofing system. The Contractor shall warrant the roofing system to conform to requirements of the contract documents. He shall further guarantee to repair the roofing system in the event of failure of any part of the roofing system for a period of two years from date of final acceptance.

C. The roofing system manufacturer shall issue a total system warranty upon completion of the project. This warranty shall cover the watertight condition of the roof and base flashing, insulation (including 15 year thermal warranty on insulation) and shall state that the roofing system will remain leak-free for a period not less than 15 years from date of completion.

D. Furnish three (3) copies of the Warranty and submit to the Architect. Warranty shall show name of Owner, name of Project, address of Project, and date on which warranty period begins.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermoplastic Polyolefin (TPO) Membrane Materials:
   1. Carlisle SynTec Incorporated: www.carlisle-syntec.com.
   2. Firestone Building Products Co: www.firestonebpco.com.
   3. GenFlex Roofing Systems: www.genflex.com.
   4. Versico Inc.. www.versico.com
   5. Substitutions: See Section 01600 - Product Requirements.

B. Insulation:
   1. Apache Products Co: www.apacheproducts.com.
   2. Atlas Roofing Products: www.atlas-roofing.com
   3. Celotex Corporation: www.celotex.com.
   4. GAF Materials Corporation: www.gaf.com.
   5. Owens Corning Corp: www.owenscorning.com.
   6. Substitutions: See Section 01600 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Roofing Assembly Requirements:
   1. Roof Covering External Fire-Resistance Classification: UL Class A.
   2. Factory Mutual Classification: Class I and windstorm resistance of I-90, in accordance with FM DS 1-28.
   3. Insulation Thermal Value (R), minimum: 30; provide insulation of thickness required.

B. Acceptable Insulation Types - Tapered Application:.
   1. Tapered polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Thermoplastic Polyolifin; internally reinforced with fabric or scrim.
   1. Thickness: 0.060 inch.
   2. Sheet Width: 36 inch, minimum; factory-fabricate into largest sheets possible.
   3. Color: White.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Flexible Flashing Material: Same material as membrane; conforming to the following:
   1. Thickness: 60 mil.
   2. Color: White.

2.04 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, and with the following characteristics:
   1. Facing: Asphalt felt or mat both faces.
   2. Board Size: 48 x 96 inch.
   3. Tapered Board: Slope as indicated; minimum thickness 1/4 inch; fabricate of fewest layers possible.
   4. Board Thickness: As indicated or required to meet R-Value.
   5. Minimum Board Thickness: 1-1/2 inch.
   6. Thermal Resistance: Manufactured R-value of 7.1 per inch.
   7. Board Edges: Square.
   8. Board Density: 1.8 lb/cu ft.

2.05 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

C. 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, with metal washers.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

F. Sealants: As recommended by membrane manufacturer.

G. Walkway Pads: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 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 reglets are in place.

3.02 INSULATION - UNDER MEMBRANE

A. Attachment of Insulation:
   1. Mechanically fasten insulation to deck in accordance with insulation manufacturer's instructions and Factory Mutual requirements.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch 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 insulation manufacturer's instructions.

F. Do not apply more insulation than can be covered with membrane in same day.

3.03 MEMBRANE APPLICATION

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 1.7 gal/square. Fully embed membrane in adhesive except in areas directly over or within 3 inches 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. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to termination bar.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of roof drains and related flashings.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

B. Roof Surveys:
   1. One month prior to Final Inspection, the Owner may require a Non-Destructive Roof Survey of all completed roof surfaces. Cost for this survey shall be the responsibility of the Owner.
   2. The test shall consist of complete visual inspection of the roof and all flashing and/or waterproofing elements.
   3. The survey shall be "Non-Destructive" in nature and only minor corings or guts shall be approved to prove survey results.
   4. All damaged areas shall be catalogued and presented to the Owner, the Architect, the General Contractor, the Roofing Subcontractor, and all other prime Contractors having penetrations through the roof deck as part of their contract. This report shall be completed, on hand, at the time of final inspection.

C. Require site attendance of roofing and insulation material manufacturers regularly during installation of the Work.

3.05 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.06 PROTECTION OF FINISHED WORK

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
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Metal counter flashing and base flashing.
   2. Exposed metal trim.
   3. Miscellaneous sheet metal accessories.

B. Related Items:
   1. Membrane Roofing: Refer to Section 07 54 00.

1.02 SUBMITTALS

A. Comply with Section 01 30 00, unless otherwise indicated.

B. Product Data: Manufacturer's specifications and technical data including the following.
   1. Detailed specification of construction and fabrication.
   2. Manufacturer's installation instructions.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, component connections, anchorage methods, and installation procedures, including specific requirements indicated.
   1. Layout, profiles, methods of joining, and anchorage details, including major counter-flashings, trim/fascia units, gutters, downspouts, scuppers, and expansion joint systems. Provide layouts at 1/4 inch scale and details at 3 inch scale.

D. Color Samples: 2 sets of samples for color selection or verification for the following.
   1. 12 inch long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.
   2. 8 inch square samples of specified sheet materials to be exposed as finished surfaces.

E. Quality Control Submittals:
   1. Statement of qualifications.

F. Contract Closeout Submittals: Comply with Section 01700.
   1. Special warranties.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Not less than 5 years experience in the actual production of specified products.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.05 SPECIAL WARRANTIES

A. Contractor/manufacturer/installer shall stand behind installed system for a period of 20 years from Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, Contractor/manufacturer/installer shall, promptly and without inconvenience and cost to Owner, correct said deficiencies.
   1. Paint Finish: Coil coated paint finish manufacturers warranty against peel, chip and delamination.
   2. Fading or color change in excess of 6 NBS units as measured per ASTM D2244.
   3. Chalk in excess of numerical rating of 7 when measured using the procedures in ASTM D659.

B. Water-tightness Warranty. Contractor, manufacturer and installer shall jointly warrant the installed system to remain water-tight for a period of at least 10 years from Date of Substantial Completion. Upon written notice from the Owner, they shall, promptly and without inconvenience and cost to Owner, correct said deficiencies.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sheet Metal: Zinc-coated steel; commercial quality with 0.20 percent copper, ASTM A526 except ASTM A527 for lock-forming, G90 hot-dip galvanized, mill phosphatized where indicated for painting.
   1. Base material:
      a. Copings: 24 gauge hot-dipped galvanized steel.
   2. Color: As indicated in Drawings.
   3. Finish manufacturer's touch-up paint for field touch-up of fasteners and abrasions.
   4. Screws and fasteners: Prefinish galvanized steel.
   5. Exposed finishes: Fluoropolymer Kynar 500 resin-base, 2 coat finish. System consisting of a thermo-cured inhibitive primer and top coat factory applied over pretreated base metal. Not less than 1.2 mil dry film thickness.
   6. Acceptable Manufacturers for Prefinished Galvanized Steel:
      a. Ryerson: ColorKlad.
      b. Petersen Aluminum Corporation: Pac-Clad.
      c. Firestone Metal Products: Una-Clad.

B. Sheet Metal: Standard sheet metal bonderized galvanized iron, ASTM A525.
   1. Provide at concealed locations where specifically indicated.
      a. Counter flashing: 24 gauge, unless otherwise indicated.
      b. Concealed from sheet metal and sheet metal trim to receive field applied paint finish.

2.02 MANUFACTURED UNITS

A. Reglets: Same material as metal flashing, provide as follows:
   1. Surface-mounted reglet: 2 piece system with 24 gauge galvanized steel reglet with non-corrosive fasteners at 16 inches on center with 7/8 inch diameter stainless steel and neoprene washers. Counterflashing: 5 inch, 26 gauge galvanized or prefinished flashing (where applicable).
      a. Provide complete with prefabricated interior and exterior corners.
      b. Acceptable manufacturers and products:
         1) Fry Reglet Corp.: Springlok Flashing System -Type SM.
         2) Comparable product by other manufacturers.
   2. At above conditions where counterflashing is used in conjunction with flexible roofing, provide special vinyl insert similar to the following:
      a. Acceptable manufacturers and products:
         1) Fry Reglet Corp.: Vinylok Flashing Retainer.
         2) Comparable product by other manufacturers.

2.03 ACCESSORIES

A. Fasteners: Provide sheet metal clips, straps, anchoring devices, and similar accessory units for installation, compatible with material being installed, noncorrosive, size and gauge required for performance.
   1. Concealed hook and continuous keeper strips: 20 gauge galvanized iron, unless otherwise indicated.
   2. Clips and retainers: 24 gauge galvanized iron, unless otherwise indicated.
   3. Nails, screws, bolts, expansion shields, and other fastenings: Compatible materials recommended for intended use by manufacturer of sheet metal. Provide types, gauges, and lengths to suit installation conditions.
      a. Nails: No. 10 gauge or larger, needle point.
      b. Use screws through neoprene washers for exposed fasteners.
      c. Use toothed steel or lead expansion inserts when anchoring to concrete or masonry work.

d. Provide galvanized steel fasteners for galvanized steel materials and stainless steel fasteners with lead coated copper materials.
e. Provide aluminum or stainless steel fasteners at aluminum sheet metal.

B. Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B32), with rosin flux.

C. Flux: Commercial soldering flux.

D. Bituminous Paint: Acid and alkali resistant type, black in color.

E. Sealant for Sheet Metal Work: Provided under this Section, but in compliance with requirements of Section 07 90 05.
1. Mastic sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

F. Epoxy Seam Sealer: 2-part non-corrosive metal seam cementing compound recommended by manufacturer for exterior/interior non-moving joints including riveted joints.

G. Elastic Flashing Filler: Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

H. Polyethylene Underlayment: Not less than 6 mil carbonated polyethylene film resistant to decay when tested in compliance with ASTM E154.

2.04 FABRICATION

A. Shop-fabricate Work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices.
1. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running Work, sufficient to permanently prevent leakage, damage, or deterioration of the Work.
2. Comply with material manufacturer's instructions and recommendations for forming material.
a. Form work to fit substrates.
b. Form exposed sheetmetal Work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams.
1. For metal other than aluminum, tin edges to be seamed, form seams, and solder.
2. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in Work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of Work, form metal to provide for proper installation of sealant, in compliance with SMACNA standards.

E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual".

1. Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
2. Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated.
3. Install Work with laps, joints, and seams which will be permanently watertight and weatherproof.

B. Parapet Flashing: Install membrane flashing continuously at parapet details, turn down vertical edges not less than 2 inches. Seal seams with membrane adhesive.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 6-inch centers.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 6-inch centers. Anchor interior leg of coping with screw fasteners and washers at 24-inch centers.

E. Bed flanges of Work in a thick coat of bituminous roofing cement where required for waterproof performance.

F. Install reglets to receive counterflashing in manner and by method indicated.
1. Install counter flashing in reglets, either by snap-in seal arrangement, or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

G. Nail flanges of expansion joint units to curb nailers, at spacing of not more than 6 inches on center. Fabricate seams at joints between units with not less than 3 inch overlap, to form a continuous, waterproof system.

3.03 CLEANING

A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

3.04 PROTECTION

A. Protect flashings and sheetmetal Work during construction, to ensure that Work will be without damage or deterioration, other than natural weathering at time of substantial completion.

END OF SECTION

SECTION 07 71 23

MANUFACTURED SCUPPERS, GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-finished aluminum scuppers, collection boxes, gutters and downspouts.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Scuppers, Collection Boxes Gutters and Downspouts:
   1. W.P. Hickman Company: www.wph.com
   2. ATAS International, Inc: www.atas.com.
   2. Cheney Flashing Company: www.cheneyflashing.com.
   3. Perimeter Systems: www.perimeter-systems.com.

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

2.02 MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M); 0.032 inch thick.

2.03 COMPONENTS

A. Prefabricated Scuppers, Collection Boxes and Gutters: Profile as indicated.

B. Downspouts: SMACNA Rectangular profile.

C. Anchors and Supports: Profiled to suit scuppers, collections boxes gutters and downspouts.
   1. Anchoring Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Straps.
   3. Downspout Supports: Straps.

D. Fasteners: Same material and finish as scuppers, collection boxes, gutters and downspouts, with soft neoprene washers.

2.04 FABRICATION

A. Form scuppers and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.05 FACTORY FINISHING

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; custom color to match approved sample.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Install scuppers, collection boxes, gutters, downspouts, and accessories in accordance with manufacturer's instructions.

B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal scuppers to downspouts and accessories.

C. Connect downspouts to storm sewer system. Grout connection watertight.

END OF SECTION

07 72 00

ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof hatches.

1.02 RELATED REQUIREMENTS

A. Section 05 31 00 - Steel Decking.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 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.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 ROOF HATCHES

A. Manufacturers - Roof Hatches:
   1. Bilco Co.: Type S www.bilco.com
   2. Dur-Red Products: www.dur-red.com.
   3. Babcock Davis: www.babcockdavis.com
   3. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Roof Hatches: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
   1. Style: Provide flat metal covers unless otherwise indicated.
   2. Mounting: Provide frames and curbs suitable for mounting on flat roof deck.
   3. Ladder Access: Single leaf; 30 by 36 inches.

C. Frames/Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Material: Mill finished aluminum, 11 gage, 0.125 inch thick.
   2. Insulation: 1 inch rigid glass fiber, located on outside face of curb.
   3. Curb Height: 12 inches from finished surface of roof, minimum.

D. Metal Covers: Flush, insulated, hollow metal construction.
   1. Capable of supporting 40 psf live load.
   2. Material: Mill finished aluminum; outer cover 0.125 inch thick, liner 0.04 inch thick.
   3. Insulation: 1 inch rigid glass fiber.
   4. Gasket: Neoprene, continuous around cover perimeter.

E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
   1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
   2. Hinges: Heavy duty pintle type.
   3. Hold open arm with vinyl-coated handle for manual release.
   4. Latch: Upon closing, engage latch automatically and reset manual release.
   5. Manual Release: Pull handle on interior.
   6. Safety Railing: Manufacturer's standard meeting required code.
   7. Locking: Padlock hasp on interior.
   8. Telescopic Safety Post: Spring balanced, automatic locking safety post; Bilco LadderUp

PART 3 EXECUTION

3.01 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.

3.02 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.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing including.
   1. Joint sealants for interior and exterior joints in vertical surfaces and horizontal non-traffic surfaces.
   2. Joint sealants and fillers in interior concrete floor slab-on-grade joints.

1.02 RELATED REQUIREMENTS

A. Section 07 54 23 – Mechanically Attached Thermoplastic Membrane Roofing: Sealants required in conjunction with roofing.

B. Section 07 62 00 - Sheet Metal Flashing and Trim.

C. Section 08 80 00 - Glazing: Glazing sealants and accessories.

1.03 REFERENCE STANDARDS

A. ASTM C 834 - Standard Specification for Latex Sealants.

B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C 1193 - Standard Guide for Use of Joint Sealants.

E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell).

1.04 SUBMITTALS

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

B. Product Data: Provide data indicating sealant chemical characteristics.

C. Samples for Selection: Manufacturer’s color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Caulking Schedule: The Contractor, together with the manufacturer's selected from those specified, shall prepare a detailed schedule of caulking and sealing work. For all conditions, the schedule shall indicated joint function; materials forming the joint together with cleaning, preparation, and backing requirements; priming requirements; sequence and timing of caulking and sealing operations showing maximum allowable time joints may be exposed before sealing, minimum and maximum allowable time intervals between successive steps in sealing operations, and governing weather conditions including temperature, humidity, wind, etc., and requirements for storage and preconditioning of materials.

1.05 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation. Install in dry weather or conditions favorable for curing.

1.07 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.08 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. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177 .2600.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range, unless otherwise indicated.

2.01 MANUFACTURERS

A. Silicone or Hybrid Sealants:
   1. Momentive Performance Materials, Inc (formerly GE Silicones); Product Silpruf: www.momentive.com.
   2. Pecora Corporation.; Product 890NST: www.pecora.com.
   3. Sika; Product Sikasil WS-290: www.sikausa.com
   4. BASF Construction Chemicals-Building Systems; Product Masterseal NP 150: www.master-builders-solutions.basf.us
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Acrylic Emulsion Latex Sealants:
   1. Pecora Corporation.; Product AC-20: www.pecora.com.
   2. Degussa Building Systems/Sonneborn; Product Sonalac: www.degussabuildingsystems.com
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SEALANTS

A. Low Modulus Elastomeric Hybrid Sealant: Moisture curing; ASTM C 920, Grade NS, Class 50, Uses NT, A, M, G, and O; single component.
   1. Color: Standard colors matching finished surfaces.
   2. Product: Masterseal NP 150 by BASF, 890NST by Pecora, or approved equal.
   3. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete tilt-up panels.
      c. Joints between concrete and other materials.
      d. Joints between metal frames and other materials.
      e. Other exterior joints for which no other sealant is indicated.

B. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. Product: AC-20 manufactured by Pecora or approved equal.
   3. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

C. Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.
   1. Product: 898 Sanitary Silicone manufactured by Pecora, Sanitary 1700 AS as manufactured by General Electric or approved equal.
   2. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between bath countertops and wall surfaces.

D. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Product: AC-20 FTR Acoustical and Insulation Sealant manufactured by Pecora Corp. or approved equal.
   2. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor.

E. Interior Slab on Grade Joint Sealant:
   1. Preformed Expansion (Isolation) Joint Filler (PMEJ) Strips: Flexible closed-cell synthetic foam expansion joint strips, non-extruding, for full depth of concrete.
      a. Ceramar Flexibe Foam Expansion Joint, by W.R. Meadows.
      b. Deck-0-Foam Expansion Joint Filler, by W.R. Meadows
      c. Expansion Joint Filler, by BASF Building Systems (Degussa).
   2. Elastomeric Joint Materials: Polyurethane Sealant; ASTM C920, Type S, Grade P, Class 25, single component.
      a. Urexpan NR-201 manufactured by Pecora or approved equal.
      b. Joint Back-Up Material: Polyethylene Foam, 100% closed cell.
   3. Semi-Rigid Epoxy Joint Filler: 100% solids, 2-part cured Shore A hardness of 85 to 100.
      a. MM-80 manufactured by Metzger/McGuire.
      b. Euco 700 manufactured by Euclid Chemical.
   4. Polyurea Joint Filler: Rapid setting, two component polyuria polymer liquid of 100% solids content, Shore Hardness of 90 to 95.
      a. Spall-Pro RS 88 manufactured by Metzger/McGuire.
      b. Euco Qwik Joint 200 manufactured by Euclid Chemical.
   5. Joint Filler Stain Preventing Film:
      a. SPF by Metzger/McGuire.
      b. Euco CleanCut by Euclid Chemical.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Accessories, including glazing.

1.02 RELATED REQUIREMENTS

A. Section 04 27 31 - Reinforced Unit Masonry: Masonry grout fill of metal frames.

B. Section 08 14 16 - Flush Wood Doors.

C. Section 08 71 00 - Door Hardware.

D. Section 08 80 00 - Glazing: Glass for doors.

E. Section 09 90 00 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.

B. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

E. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers.

F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

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

H. UL 10B - Standard for Fire Tests of Door Assemblies.

1.04 SUBMITTALS

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

B. Shop Drawings: Submit shop drawings of all items specified herein. Obtain approval of Drawings prior to proceeding with manufacturing. Shop drawings shall indicate following: elevations of each door type; details of each frame type, location in building for each item; conditions at openings with various wall thicknesses and materials; typical and special details of construction; methods of assembling sections; location and installation requirements for hardware; size, shape and thickness of materials; anchorage; joints and connections; and any additional pertinent information.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Steelcraft: www.steelcraft.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Interior doors and frames shall be constructed of commercial quality cold-rolled steel conforming to ASTM A 366 or commercial quality cold rolled steel conforming to ASTM A 924, hot dip galvanized to ASTM A 653, Commercial Steel (CS), coating designation A25, commercially known as Paintable Galvanneal.
   2. Exterior doors and frames shall be constructed of cold-rolled steel conforming to ASTM A 924, hot-dip galvanized to ASTM A 653, Commercial Steel (CS), coating designation A25, commercially known as Paintable Galvanneal or G-60 Galvanized.
   3. Finish: After appropriate metal preparation, all exposed surfaces of cold-rolled and galvanized steel doors and frames to receive a factory applied coat of primer. Galvanneal steel doors and frames shall receive zinc-rich primer touch-up only, at areas where galvanizing has been removed during fabrication.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all 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.

2.03 STEEL DOORS

A. Types and Gauges of Metal: Metal for doors shall be commercial quality, leveled, cold-rolled, steel sheets with clean, smooth surfaces. Metal shall be phosphate treated prior to painting. Gauges of face sheets shall be 18 gauge, minimum.

B. Hardware Reinforcements: Doors shall be mortised, reinforced, drilled and tapped at factory for fully template hardware only, in accordance with approved HARDWARE SCHEDULE and templates provided by Hardware Contractor. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by others.

C. Edge Profiles:
   1. Bevels shall be provided on lock stiles of doors as follows:
   2. Single acting swing doors - beveled 1/8 inch in 2 inches.

D. Clearances:
   1. Between doors and frames; at head and jambs - 1/8 inch.
   2. At door sills, where no threshold is scheduled - 3/8 inch maximum.
   3. At door sills, where threshold is scheduled - 1/4 inch maximum between door bottom and threshold
   4. Between meeting stiles or pair of doors - 1/8 inch.

E. Workmanship: Finish work shall be rigid, neat in appearance, and free from defects. Form moulded members straight and true, with joints coped or mitered, well formed, and in true alignment. All welded joints on exposed surfaces shall be dressed smooth so that they are invisible after finishing.

F. Reinforcement: Provide continuous reinforcing channels welded to face sheets at top and bottom of door. Place cork, fiberboard or mineral wool board in spaces between reinforcing channels.

G. Mouldings: Mouldings shall be not lighter than 18 gauge steel. Doors shall be prepared to receive hardware specified under Hardware Section.

H. Exterior Doors:
1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless.
2. Core: Polystyrene foam.
3. Top Closures for Outswinging Doors: Flush with top of faces and edges.
4. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
5. Texture: Smooth faces.
6. Insulating Value: R-value of 5, when tested in accordance with ASTM C 236.
7. Weatherstripping: Separate, see Section 08 71 00.
8. Finish: Factory primed, for field finishing.

I. Interior Doors, Non-Fire-Rated:
1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
2. Core: Cardboard honeycomb.
3. Thickness: 1-3/4 inches.
4. Texture: Smooth faces.
5. Finish: Factory primed, for field finishing.

J. Interior Doors, Fire-Rated:
1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10B or NFPA 252 ("neutral pressure").
3. Core: Mineral fiberboard.
4. Texture: Smooth faces.
5. Finish: Factory primed, for field finishing.

2.04 STEEL FRAMES

A. General:
1. Frames, including glazing in door, shall be combination type with integral trim and fabricated with mitered and full welded face type construction at corners.
2. Type and Gauges of Metal: Metal for interior frames shall be phosphate-treated prior to painting. Frames shall be fabricated from steel not lighter than the following gauges:
   a. Exterior frames: 14 gauge
   b. Interior frames: 16 gauge
3. Metal Reinforcement: Provide concealed metal reinforcements for hardware as required. Gauge of metal for reinforcement shall be in accordance with manufacturer's recommendations for type of hardware and the thickness and width of doors to be hung in frame, provided gauges used are not lighter than following:
   a. Hinge and pivot reinforcements (1-1/4 inch x 10 inch minimum size): 7 gauge
   b. Strike reinforcements: 12 gauge
   c. Flush bolt reinforcements: 12 gauge
   d. Closer reinforcements: 12 gauge
   e. Surface mounted hardware reinforcement: 12 gauge

4. Workmanship and Design: The finished work shall be strong and rigid, neat in appearance, and free from defects. Fabricate moulded members straight and true, with corner joints well formed and in true alignment, and with fastenings concealed where practicable.
5. Forming Corner Joints:
   a. Corner joints shall have all contact joints tight with trim face mitered and continuously welded and stops butted and welded on back.
6. Provisions for Hardware: Frames shall be prepared at the factory for the installation of hardware. Frames shall be mortised, reinforced, drilled and tapped to templates to receive all mortised hardware; frames to receive surface-applied hardware shall be provided with reinforcing plates only. Provide cover boxes in back of all hardware cutouts. Door frames shall be punched to receive rubber door silencers; provide three silencers on lock side of single doors and one silencer for each leaf in heads of double door frames.
7. Wall Anchors:
   a. Provide metal anchors of shapes and sizes required for the adjoining type of wall construction. Fabricate jamb anchors of steel, not lighter than the gauge used for frame. Locate anchors on jambs near the top and bottom of each frame and at intermediate points not over 24 inches apart.
   b. For frames set in masonry: Provide 10 inches long, corrugated or other deformed type adjustable anchors at jambs.
   c. For frames set in metal stud partitions: Weld jamb anchor clips to back of frames at jambs. Make provisions for securing anchors to steel studs with 1/4 round-head self-tapping screws, or by welding.
8. Floor Anchors: Provide floor clips of not less than 16-gauge steel and fasten to bottom of each jamb member for anchoring frame to floor construction. Clips shall be fixed and drilled for 3/8 inch diameter anchor bolts.
9. Stops and Beads: Furnish 20-gauge metal glazing beads with the hollow metal frames at transoms, sidelights, interior glazed panels, and other locations where beads are indicated in hollow metal frames. Beads shall be minimum 5/8 inch high. Drill and tap frames to receive the type of glazing beads, stops and gaskets required. Secure beads to frames with countersunk self-taping screws, spaced approximately 16 inches o.c. Beads having a moulded shape shall be mitered at corners; square or rectangular beads may be either mitered or butted at corners.
10. Finish: Same as for door.
11. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
12. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
13. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08 71 00.

C. Interior Door Frames, Non-Fire-Rated: Fully welded type.

D. Interior Door Frames, Fire-Rated: Fully welded type.
   1. Fire Rating: Same as door, labeled.

2.05 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08 80 00, factory installed.

B. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

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. Coordinate installation of hardware.

F. Coordinate installation of glazing.

3.04 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE - See Drawings

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush solid core high pressure decorative laminate faced doors; fire rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

B. Section 08 71 00 - Door Hardware.

C. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. ICC (IBC) - International Building Code.

B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc..

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

D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc..

E. UL 10B - Standard for Fire Tests of Door Assemblies.

1.04 SUBMITTALS

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

B. Product Data: Indicate door core materials and construction; veneer type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.

E. Samples: Submit two samples of door construction, 6 x 6 inches in size cut from top corner of door.

F. Warranty, executed in Owner's name.

1.05 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. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas. Break seal on site to permit ventilation.

1.06 WARRANTY

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

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High Pressure Decorative Laminate Faced Doors:
   1. Ampco Products, Inc.: www.ampco.com.
   2. VT Industries, Inc: www.vtindustries.com.
   3. Poncraft Door Co.; www.poncraft.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

A. All Doors: See drawings for locations and additional requirements.
   1. High Pressure Decorative Laminate Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252, UL 10B, or UBC Standard 7-2-94 ("neutral pressure"); UL or WH (ITS) labeled without any visible seals when door is open.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. High Pressure Decorative Laminate Facing for Non-Fire Rated Doors: NEMA LD 3, SGF; color as indicated in Drawings.
   1. Vertical Edges: Same as face veneer.
   2. Face veneer and crossband shall be pressed to the core in a hot-press with Type I waterproof glue.

2.05 ACCESSORIES

A. Glazing Stops: Same as door facing, mitered corners; prepared for countersink style screws.

2.06 DOOR CONSTRUCTION

A. Fabricate doors in accordance with AWI Quality Standards, Section 1300 requirements.

B. Cores Constructed with Stiles and Rails.

C. Provide lock blocks at lock edge and top of door (for closer) for hardware reinforcement. Lock blocks and reinforcing for closers shall match door edge banding material.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

G. Provide edge clearances in accordance with the quality standard specified.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Clearances:
   1. Provide clearances of 1/8 inch at sides and top; lock edge shall have required bevel to clear frame. Provide at the bottom, for specific locations, the minimum adequate clearance of the finish floor coverings and/or thresholds, not to exceed 3/4 inch.
   2. Trim equal amounts of wood from each stile and rail when fitting doors.

D. Use machine tools to cut or drill for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

F. Coordinate installation of glazing.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - See Drawings

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Non-fire rated wall and ceiling access panels.
   2. Related hardware, trim and accessories.

B. Related Items
   1. Finish hardware, Section 08 71 00

1.2 SYSTEM DESCRIPTION

A. Provide access panels where required to access Work or equipment specified under Division 15 or 16. Required panels not indicated on Drawings, shall be provided by Mechanical or Electrical subcontractor as applicable, in compliance with requirements of this Section.

1.3 SUBMITTALS

A. Comply with Section 01330, unless otherwise indicated.

B. Product Data: Manufacturer's specifications and technical data including performance, construction and fabrication.

C. Samples: Submit 2 sets of samples for color selection verification for the following.
   1. Exposed finishes.

D. Quality Control: Comply with Section 01440.
   1. Statement of qualification for manufacturers and installers.
   2. Statement of compliance for Regulatory Requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Not less than 5 years experience in the actual production of specified products.

B. Regulatory Requirements: Comply with UL requirements for rated construction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.

B. Storage and Protection: Comply with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 INTERIOR NON-FIRE RATED ACCESS PANELS – FLUSH INSTALLATION

A. Painted Steel Access Panel (Back of House): Exposed steel access panel, 16 gauge frame and door panel; steel flange continuous all sides with drywall bead for concealed flange installation in gypsum board walls; concealed hinges that open to not less than 130 degrees.
   1. Size: 24 inches by 24 inches, unless otherwise indicated.
   2. Finish: Powder coat finish; color gray.
   3. Latch type: Screwdriver cam latch.
   4. Acceptable manufacturers and product:
      a. Babcock Davis: Model BNW.
      b. Milcor, Inc.: Model K.

c. J. L. Industries: Model WB.

5. Locations: Back of House areas.

2.2 INTERIOR NON-FIRE RATED ACCESS PANELS – FLUSH INSTALLATION

A. Glass Fiber Reinforced Gypsum Access Panel (Public Areas): Exposed GFRG access panel, GFRG frame and door panel with rounded corners; concealed flange installation; concealed hinges that open to not less than 130 degrees.

1. Size: 16 inches by 16 inches, unless otherwise indicated.
2. Finish: Unfinished gypsum, natural gypsum white.
3. Latch type: Screwdriver cam latch.
4. Acceptable manufacturers and product:
   a. Babcock Davis: Model BGFR.
5. Locations: Customer/Front-of-house areas.

2.3 EXTERIOR NON-FIRE RATED ACCESS PANELS – FLUSH INSTALLATION

A. Painted Steel Access Panel: Exposed exterior galvanized steel access panel, 16 gauge frame with drip cap; 14 gauge door panel; galvanized steel flange continuous all sides; with concealed hinges that open to not less than 130 degrees.

1. Size: 24 inches by 24 inches, unless otherwise indicated.
2. Finish: Powder coat finish; color gray.
3. Latch type: Key operated cylinder lock.
   a. Cylinder provided under section 08710. Coordinate with Hardware Supplier.
4. Acceptable manufacturers and product:
   a. Babcock Davis: Model BNT.
   b. Milcor, Inc.: Model K.
   c. J. L. Industries: Model XPA.

2.4 ACCESSORIES

A. Anchors: Provide type and quantity as recommended by access panel manufacturer for substrate construction type and size of panel.

B. Locks: Provide flush type key cylinder locks where specified. Key locks alike. Provide not less than 2 keys with 1 key for each access panel up to not more than 10 keys.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.

1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Position access panels to provide convenient access to concealed Work requiring access. Coordinate locations with appropriate trades.

B. Set frames plumb and level, and in proper alignment with face of wall.

1. Securely anchor frames in place.

END OF SECTION 08310

SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead coiling doors, operating hardware, non-fire-rated and exterior, electric operation.

B. Wiring from electric circuit disconnect to operator to control station.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Cylinder cores and keys.

B. Section 26 05 33.13 - Conduit for Electrical Systems: Conduit from electric circuit to operator and from operator to control station.

C. Section 26 05 83 - Wiring Connections: Power to disconnect.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

D. ITS (DIR) - Directory of Listed Products; current edition.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.

G. NEMA MG 1 - Motors and Generators; 2014.

H. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

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

B. Product Data: Provide general construction and component connections and details.

C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 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.

C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Coiling Doors:
   1. Overhead Door Company.
   2. C.H.I. Overhead Doors; Model 6182: www.chiohd.com/sle.
   3. Clopay Building Products; Model CERD20: www.clopaydoor.com/#sle.
   4. Cornell Iron Works, Inc: www.cornelliron.com.
   5. The Cookson Company: www.cooksondoor.com.
   6. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com/#sle.
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COILING DOORS

A. Exterior Coiling Doors: Steel slat curtain.
   1. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
   2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 8.1.
   3. Nominal Slat Size: 2-1/2 inches wide x required length.
   4. Finish: Factory painted, color as selected by Architect from manufacturers standard range of colors.
   5. Guide, Angles: Galvanized steel.
   6. Hood Enclosure: Manufacturer's standard; primed steel.
   7. Electric operation.
   8. Mounting: Surface mounted.
   9. Locking Devices: Slide bolt on inside with padlock provisions.

2.03 MATERIALS AND COMPONENTS

A. Curtain Construction: Interlocking 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. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.

B. Steel Slats: Minimum thickness, 18 gage, .05 inch; ASTM A653/A653M galvanized steel sheet.
   1. Galvanizing: Minimum G90 coating.

C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
   1. Hot-dip galvanized in compliance with ASTM A123/A123M.

D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
   1. Minimum thickness; 24 gage, .025 inch.
   2. Prime paint.

E. Lock Hardware:
   1. For motor operated units, additional lock or latching mechanisms are not required.
   2. Slide Bolt: Provide on single-jamb side, extending into slot in guides.

F. Roller Shaft Counterbalance: Steel pipe and helical 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 nominal force to operate.
   1. Springs: Designed for minimum 20,000 cycles.

2.04 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
   1. Provide interlock switches on motor operated units.

B. Electric Operators:
   1. Mounting: Side mounted.
   2. Motor Enclosure:
      a. Exterior Coiling Doors: NEMA MG 1, Type 4; open drip proof.
      b. Interior Coiling Doors: NEMA MG 1, Type 1; open drip proof.
      c. Motor Rating: As recommended by manufacturer, capable of driving door at a speed of no less than 8 inches per second nor more than 12 inches per second.
   3. Motor Voltage: 460 volts, three phase.
   4. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   5. Controller Enclosure: NEMA 250, Type 1.
   6. Opening Speed: 12 inches per second.
   7. Brake: Adjustable friction clutch type, activated by motor controller.
   8. Manual override in case of power failure.
   9. Refer to Section 26 05 83 for electrical connections.

C. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
   1. 24 volt circuit.
   2. Surface mounted, at interior door jamb.
   3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
      a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 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.

E. Coordinate installation of electrical service with Section 26 05 83.

F. Complete wiring from disconnect to unit components.

G. Install enclosure and perimeter trim.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 36 14

ALUMINUM SECTIONAL OVERHEAD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazed Aluminum Sectional Overhead Doors

B. Electric Operators, Controls, and Activation devices.

C. Operating Hardware, tracks, and support.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Steel frame and supports.

B. Section 07900 - Joint Sealers: Perimeter sealant and backup materials.

C. Section 08710 - Door Hardware: Cylinder locks.

D. Section 16130 - Raceway and Boxes: Empty conduit from control station to door operator.

E. Section 16150 - Wiring Connections: Electrical service to door operator.

1.03 REFERENCES

A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.04 DESIGN / PERFORMANCE REQUIREMENTS

A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
   1. Design pressure of 18 lb/sq ft.

B. Wiring Connections: Requirements for electrical characteristics.
   1. 460 volts, three phase, 60 Hz.

C. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

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. Installation methods.

C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Operation and Maintenance Data.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened labeled packaging until ready for installation.

B. Protect materials from exposure to moisture until ready for installation.

C. Store materials in a dry, ventilated weathertight location.

1.08 PROJECT CONDITIONS

A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: sales@overheaddoor.com.

B. Other Acceptable Manufacturers:
1. Clopay Corporation.
2. Wayne-Dalton Corporation.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 GLAZED ALUMINUM SECTIONAL OVERHEAD DOORS

A. Glazed Sectional Overhead Doors: 521 Series Aluminum Doors by Overhead Door Corporation.
   1. Door Assembly: Stile and rail assembly secured with 1/4 inch (6 mm) diameter through rods.
      a. Panel Thickness: 1-3/4 inches (44 mm).
      b. Center Stile Width: 2-11/16 inches (68 mm)
      c. End Stile Width: 3-5/16 inches (84 mm)
      d. Intermediate Rail Pair Width: 3-11/16 inches (94 mm).
      e. Top Rail Width:
         1) 3-3/4 inches (95 mm).
      f. Bottom Rail Width:
         1) 4-1/2 inches (114 mm).
      g. Aluminum Panels: 0.050 inch (1.3 mm) thick, aluminum.
      h. Stiles and Rails: 6063 - T6 aluminum.
      i. Springs:
         1) 25,000 cycles.
      j. Glazing:
         1) 1/2 inch (12.5 mm) Insulating Glass.
   2. Finish and Color:
      a. Powder Coating Finish: Color as selected by Architect from manufacturer's standard colors.
   3. Windload Design: Provide to meet the Design/Performance requirements specified and in accordance with local codes.
   4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
   5. Lock: Interior galvanized single unit.
   6. Weatherstripping:
      a. Flexible bulb-type strip at bottom section.
      b. Flexible Jamb seals.
      c. Flexible Header seal.
   7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
   8. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
      a. Entrapment Protection: Required for momentary contact, includes radio control operation.
         1) Electric sensing edge monitored to meet UL 325/2010.
         2) Photoelectric sensors monitored to meet UL 325/2010.
      b. Operator Controls:
         1) Push-button operated control stations with open, close, and stop buttons.
         2) 24 volt circuit.
         3) Surface mounting.
         4) Interior location.
      c. Special Operation:
         1) Radio control operation.
         2) Provide three remote controls.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until openings have been properly prepared.

B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

C. Verify electric power is available and of correct characteristics.

D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 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.

3.03 INSTALLATION

A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.

B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

C. Anchor assembly to wall construction and building framing without distortion or stress.

D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

E. Fit and align door assembly including hardware.

F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 CLEANING AND ADJUSTING

A. Adjust door assembly to smooth operation and in full contact with weatherstripping.

B. Clean doors, frames and glass.

C. Remove temporary labels and visible markings.

3.05 PROTECTION

A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

B. Protect installed products until completion of project.

C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

SECTION 08 38 00
TRAFFIC DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double-acting self-closing swinging traffic doors.

B. Door accessories.

C. Door frames.

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS

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

B. Product Data: Manufacturer's technical information for each type of door specified, including details about materials, components, profiles, gaskets, and finishes; include:
   1. Preparation and installation instructions and methods.
   2. Storage and handling requirements and recommendations.
   3. Operation and maintenance data.

C. Selection Samples: For each finish requiring color selection, submit color samples indicating full line of available colors and finishes.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 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 type of work specified in this section with not less than three years of documented experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver product in manufacturer's original unopened packages with label legible and intact.

B. Store doors at project site on edge or in upright position, under cover and elevated above grade, following manufacturer's instructions.

1.06 WARRANTY

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

B. Provide two year manufacturer warranty for molded polyethylene doors against damage due to worker-ridden vehicle traffic; state limitations in executed warranty.

PART 2 PRODUCTS

2.01 RIGID AND SEMI-RIGID TRAFFIC DOORS

A. Lightweight Plastic Double-Acting Traffic Doors :
   1. Construction: Thermoplastic sheet, ABS, 5/8 inch thick, textured finish both sides; with honeycomb polymer core and reinforced with powder coated steel U-channel back edge spine.
   2. Color: As selected by Architect from manufacturer’s standard selection.
   3. Impact Plates: Provide plastic scuff plates on both sides of doors.
   4. Push Plates: Provide stainless steel push plates on both sides of doors.

5. Manufacturers:`
    a. Eliason Doors; P-11 Plus: www.eliasoncorp.com.
    b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Door Assemblies: Provide double-acting, self-closing pairs of doors ; factory fabricated and finished, complete with hinges and specified accessories.
1. Door Swing: Minimum of 90 degrees each direction.
2. Exposed Metal Parts: Either stainless steel, extruded aluminum, or powder coated.
3. View Windows: Provide view window in each door panel unless otherwise indicated.
4. Dimensional Tolerances: Plus or minus 1/4 inch in width and height of each panel.

C. View Windows: Factory installed glazing in molded or extruded black thermoplastic or rubber gasket; centered in door width; use single glazing unless otherwise indicated.
1. Square-Shaped Window Size: 14 inches by 16 inches.
2. Single Glazing: Acrylic glazing sheet, 1/4 inch thick, clear.

D. Impact Plates: Surface applied; factory installed.
1. Scuff Plates: 24 inches high by full width of door panel, mounted at bottom of door.
2. Push Plates: 12 inches high by 12 inches wide, mounted at leading edge of door with centerline at 48 inches above floor.
3. Stainless Steel (Push Plates): Type 304, with No.4 brushed satin finish; 18 gauge, 0.0500 inch minimum base metal thickness.
4. Plastic (Scuff Plates): ABS, 0.09 inch, minimum, smooth, color as selected by Architect.

2.02 ACCESSORIES

A. Frames: Provide doors pre-hung in frames by door manufacturer; tubular steel welded frame.

B. Provide tamper proof fasteners and other hardware as recommended by manufacturer for complete installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that jambs and frames are square and plumb.

B. Verify that opening is ready to receive work and opening dimensions and clearances are as indicated on drawings.

C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.

D. Commencement of work by installer is acceptance of opening conditions.

3.02 INSTALLATION

A. Install doors with clearances, anchors, hardware, and accessories according to the manufacturer's instructions and as specified.

B. Install doors plumb, level, and properly aligned.

3.03 ADJUSTING

A. Clean and lubricate operating parts.

B. Adjust doors to open and close smoothly and freely without binding and for proper fit of seals.

3.04 CLEANING

A. Clean surfaces using methods as recommended by manufacturer.

3.05 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 08 43 13

ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior and interior aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

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.

D. Section 08 44 13 - Aluminum-Framed Curtain Wall.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association.

C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers.

D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric].

F. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.04 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements, as measured in accordance with ASTM E 330:
   1. Wind loads: Comply with requirements of ASCE 7 and applicable local building code.
   2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.

D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 12 lbf/sq ft.

E. 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.

F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.05 SUBMITTALS

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

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

C. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass, glazing materials.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.08 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

2.01 MANUFACTURERS

A. Exterior Storefront:
   1. Kawneer Model VG451TCG

B. Interior Storefront:
   1. Kawneer Model VG450CG with 1-3/4 inch sight line.

C. Substitutions: Not permitted.

2.02 COMPONENTS (EXTERIOR STOREFRONT SYSTEM)

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing stops: Flush.
   2. Cross-Section: As indicated on drawings.

B. Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 5 inches wide.
   3. Vertical Stiles: 5 inches wide.
   4. Bottom Rail: 10 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.03 COMPONENTS (INTERIOR STOREFRONT SYSTEM)

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. Color: Clear anodized.

B. Aluminum Framing Members: Tubular aluminum sections.
   1. Glazing stops: Flush.
   2. Cross-Section: As indicated on drawings.

C. Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 5 inches wide.
   3. Vertical Stiles: 5 inches wide.
   4. Bottom Rail: 10 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).

B. Fasteners: Stainless steel.

C. Exposed Flashings: 0.032 inch thick aluminum sheet; finish to match framing members.

D. Concealed Flashings: 0.018 inch thick galvanized steel.

E. Perimeter Sealant: As specified in Section 07 90 05.

F. Glass: As specified in Section 08 80 00.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

H. Glazing Accessories: As specified in Section 08 80 00.

2.06 FINISHES

A. Finish:
   1. Architectural Class II Clear Anodic Coating; AA-M12C22A31, AAMA 611.

B. Concealed Metal Surfaces: Provide protective coatings to metal surfaces concealed in construction:
   1. Coating for Carbon Steel: Hot dip galvanized, complying with ASTM A123.
   2. Coating for Aluminum and Carbon Steel: Where aluminum or carbon steel surfaces are in contact with each other or in contact with dissimilar materials, and where hot dip galvanizing of carbon steel is incompatible with component parts because of galvanic action or component fabrication tolerances provide one of the following:
      a. Bituminous Paint: Cold applied, nonsagging, asphalt mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos. Apply in 2 coats for overall minimum dry film thickness of 25 mils.
      b. Zinc Rich Primer: Organic zinc rich primer, complying with SSPC-Paint 20.

2.07 HARDWARE

A. Door Hardware: As specified in Section 08 71 00.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

2.08 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof for exterior applications.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce components internally for door hardware.

G. Reinforce framing members for imposed loads.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 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. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Set thresholds in bed of mastic and secure.

K. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

L. Install perimeter sealant in accordance with Section 07 90 05.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware for smooth operation.

3.05 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. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION

SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

2.01 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Glazed aluminum curtain wall assemblies.
   2. Aluminum trim, snap in sealant stops, flashings, and similar items in conjunction with aluminum curtain wall assemblies.
   3. Internal steel and aluminum reinforcements.
   4. Internal and perimeter sealing, joint fillers, weeps, vents and gasketing systems.
   5. Anchors, embedments, shims, fasteners, inserts, expansion devices, accessories, support brackets, attachments, and grout.

B. Related Sections:
   1. Section 07 42 64 - Aluminum Composite Wall Panels.
   2. Section 07 90 05 - Sealants.
   3. Section 08 43 13 - Aluminum Framed Entrances and Storefronts.

2.02 PERFORMANCE REQUIREMENTS

A. Provide glazed aluminum curtain wall systems meeting or exceeding performance requirements:
   1. Structural Properties:
      a. Wind Loads: Design, fabricate, and install glazed aluminum curtain wall work, including glass, to withstand the maximum inward and outward wind pressures required by applicable local building code.
         1) Basic Wind Speed: Refer to Structural Drawings.
         2) Exposure Category: Refer to Structural Drawings.
         3) Importance Factor: Refer to Structural Drawings.
      b. Snow Loads for Sun Control Devices: As required by ASCE 7 for the geographic location of the building.
      c. Deflection Limitations:
         1) Deflections: Base calculations for deflections upon the combination of maximum direct wind loads, building deflections, thermal stresses, and erection tolerances.
            a) The deflection of the framing members for each unit of glass in a direction normal to the plane of the wall when subjected to the full code required wind loads indicated above not to exceed L/175 of the glass edge length for spans up to 13’-6” and L/240+1/4” on spans over 13’-6”.
            b) Glass, sealants, and interior finishes shall not be included to contribute to framing member strength, stiffness, or lateral stability.
            c) Cantilever Deflection: The deflection of a framing member overhanging an anchor point shall be limited to 2L/175 where L is the length of the cantilevered member.
            d) In addition to the above deflections, stone supporting aluminum framing members shall be limited to 1/600 parallel and perpendicular to the wall plane, with rotation of continuous member on kerfed stone limited to a maximum of 1/16 inch (1.5 mm).

2) Do not permit any permanent deformation (set) in the metal framing work. Permanent deformation, fastener, weld, or gasket failure, component breakage or disengagement shall not occur under wind loading equal to 1.5 times the wind loads (positive or negative). Permanent deformation shall be taken as deflection without recovery exceeding 1/1000 times span.

d. Dead Loads:
   1) Maximum full deadload deflections, parallel (in-plane) to wall plane, of framing members shall not reduce glass bite or glass coverage, to less than 75% of the design dimension, and shall not reduce edge clearance to less than 25% of design dimension or 1/8 inch (3 mm) whichever is greater.
   2) Limit deflections of metal members spanning door openings to 1/300. The clearance between the member and an operable door shall be no less than 1/16 inch (1.5 mm).
   3) Twisting (rotation) of the horizontals due to the weight of the glass shall not exceed 1 degree, measured between ends and center of each span.

e. Uniform Structural Loads: Recent satisfactory uniform wind loading tests, acceptable to the Architect, of each glazed curtain wall assembly (each window, window wall, curtain wall, entrance and storefront) shall have been conducted in accordance with the requirements of ASTM E330.
   1) Each assembly shall have been subjected to inward and outward acting uniform loads equal to 1.5 times the inward and outward acting design wind loads specified.
   2) Satisfactory performance at loads shall mean no glass or component breakage, component disengagement, and no permanent deformation of main framing members in excess of the permanent deformation criteria specified above.
   3) The qualification of recent test results is to limited glazed curtain wall assemblies to those tested within the past 7 years and under conditions similar to the project requirements.
   4) In the absence of satisfactory test results, a full scale laboratory mock up and testing program shall be required and conducted to the extent specified.

f. Operational (Traffic) Loads: Design and fabricate entrances to withstand the operating loads which result from heavy traffic conditions using the specified hardware, without measurable permanent deflection. Limit elastic deflections so as to provide the normal degree of rigidity required to avoid glass breakage, air leaks and objectionable results of excessive flexibility. Provide weatherstripping at stiles, sill and head rails of door leaves, to minimize air, water and sound leaks.

B. Air Leakage: Air leakage through each glazed aluminum curtain wall assembly shall not have exceeded 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested in accordance with ASTM E 283 at a static air pressure difference of 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration:
   1. Water penetration in this specification is defined as the appearance of uncontrolled water, other than condensation, on any indoor face of any part of the wall.
   2. Provision shall be made to drain to the exterior face of the wall any water entering the system.
   3. No uncontrolled water penetration shall have occurred when each glazed aluminum curtain wall assembly (each window, window wall, curtain wall, entrance and storefront wall) was tested in accordance with the ASTM E331 for one 15 minute cycle at a static pressure difference of 12 lbf/sq. ft. (600 Pa) minimum.

D. Thermal Movements: Fabricate the glazed aluminum curtain wall work to accommodate for such expansion and contraction of component materials, and supporting elements, as will be caused by surface temperatures ranging from -5 degrees F to +180 degrees F (-20.5 degrees C to +82 degrees C), without causing noise, buckling, glass breakage, failure of joint sealants, undue stress on metal members and fasteners, failure of doors or other operating units to function properly, reduction of performance, and other detrimental effects.
   1. Dimensions shown on Drawings are based on an assumed design temperature of +70 degrees F (+21 degrees C). Fabrication and erection procedures shall take into account the ambient temperature range at the time of the respective operations.

E. Building Frame Movement: Design, fabricate and install glazed aluminum curtain walls to withstand building movements including thermal movements, loading deflections, shrinkage, creep and similar movements without glass breakage, anchor failures, or structural damage. Thermal movements shall be as specified above. Building frame deflections, shrinkage, creep and other movements are available from the structural engineer.

F. Condensation Resistance: Design, fabricate and install the curtain wall systems to prevent excessive condensation on the indoor exposure of the wall with the mechanical system functioning under the following operating conditions. Excessive condensation is defined as the accumulation of uncontrolled condensate flowing from the curtain wall at any location, or visible ice, frost, or water on more than 5% of the area of any module of the exterior wall.
   1. Outdoor: Ambient temperature of -5 degrees F (-20.5 degrees C), 15 mph wind.
   2. Indoor: Ambient temperature of +70 degrees F (+21 degrees C), relative humidity of 30%.

G. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of minimum 71 when tested according to AAMA 1503.1.

H. Average Thermal Conductance: Provide glazed aluminum curtain wall systems with average U values of maximum 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) when tested according to AAMA 1503.1.

I. Glass Statistical Factor: Glass thicknesses when shown on the drawings, or specified, are for convenience of detailing only and are to be confirmed by the Contractor and/or glass manufacturer. Provide glass for the size openings shown in thickness for probability of breakage at the design Wind Load will not exceed 8 lites per 1000 lites (S.F. 2.5) based on a 3 second gust wind load duration, and reflectance and shading indicated. The glass manufacturer shall provide, on request, substantiating glass breakage data if data is not available as manufacturer's published data.
   1. Minimum Glass Thickness: 6.0 mm (1/4”).
   2. Assume exterior glass to be nonvented due to the use of interior sun screening devices such as shades and horizontal venetian blinds.

J. Sound Transmission: Design, fabricate and install exterior windows, doors, and glazed wall sections with minimum outdoor-indoor transmission class (OITC) of 26 according to ASTM E 1332, determined by testing according to AAMA 1801.

K. Design Modifications:

1. Submit design modifications necessary to meet the performance requirements and field coordination.
2. Variations in details or materials shall not adversely affect the appearance, durability or strength of components, nor shall such variations cause excessive stress, or deflections, to the building structural frame.
3. Maintain general design concept without altering size of members, profiles and alignment.

2.03 SUBMITTALS

A. Combined Submittals:
1. The shop drawings for exterior curtain wall and storefront work for the entire project shall be combined into a single submission.

B. Product Data: Technical data, manufacturer specifications, and installation instructions for each glazed aluminum curtain wall component specified.

C. Shop Drawings: Submit shop drawings showing scaled elevations, plans, and sections of glazed aluminum curtain wall work. Prepare and submit full scale sections for details of the assemblies that cannot be shown in the elevations or sections. Include with shop drawings metal thickness of metal components, glass thickness, metal finishes, and pertinent information necessary or requested by the Architect to indicate compliance with the Contract Documents.
1. Details of field connections, anchorage, and relationship to work of others shall be clearly indicated for the coordination of the work by other building trades.
2. Details of fastening and sealing methods and product joinery shall be shown to ensure proper performance of the field installation.
3. No work shall be fabricated until shop drawings for that work have been approved by Architect for fabrication.

D. Samples: Submit samples before work is fabricated:
1. Three paired sets of samples for each exposed metal finish required. Submit sample finishes on specified alloy, temper, and thickness of metal required for the work. Where finishes involve color and texture variations, include sample sets showing the full range of variations expected. Furnish samples in 12 inch (300mm) lengths of rails, or 12 inch (300mm) squares of sheet.

E. Structural Calculations: Submit, for information only, copies of structural calculations indicating complete compliance with the specified performance requirements. Submit calculations prepared, signed, and sealed by a Professional Engineer registered in the state where the work is to be erected.

F. Field Test Reports: Submit field testing reports.

G. Product Test Reports: Submit certified product test reports based on tests performed by an AAMA Accredited Laboratory within the past 3 years clearly describing in written form, and in shop drawing form, compliance of each glazed aluminum curtain wall assembly (each window, window wall, curtain wall, entrance and storefront) with requirements indicated based on comprehensive testing.

H. Maintenance Instructions: Submit copies of manufacturer's written instructions for adjustment, operation and maintenance of swinging and sliding doors.

I. Preconstruction Sealant Compatibility and Adhesion Testing: Submit test results.

J. Thermal Break Testing: Test results of thermal break construction are mandatory for thermally broken curtain wall extrusion designs prior to mock-up and testing.

2.04 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable requirements of local building authority for exterior walls.
   2. Welding Standards: Welding shall be performed by skilled and qualified mechanics. Welding shall be performed in accordance with the applicable provisions of AWS D1.1 *Structural Welding Code - Steel* and AWS D1.2 *Structural Welding Code--Aluminum*.

B. Manufacturer Qualifications: All framing components, drawings and specifications are based on Kawneer 1600 - System 2 Curtain Wall System**.**

C. Sole Source Responsibility: Manufacturer/fabricator of aluminum curtainwall and aluminum storefront and entrances [and aluminum (interior) partition framing and door system] shall be the same.

D. Field Testing: Test the curtain wall in accordance with standard field test methods. Test 10% of the frames, if test fails, then test all the frames 100%. Conduct tests in the presence of the Architect and/or the General Contractor
   1. Field Test for Water Leakage:
      a. Water Spray Test with Static Air Pressure Difference: ASTM E1105 and AAMA 501.2 conducted at a Uniform Static Test Pressure of 12 lbf/sq. ft. (600 Pa).
      b. Correct deficiencies observed as a result of this test.

E. Preconstruction Sealant Compatibility and Adhesion Testing: Test results confirming compatibility and adhesion are mandatory for concealed and exposed sealant materials in contact with exterior glazing, stone, precast, masonry, wood, metals, sealants, flashings, metal framing, and shims prior to full size sample installation construction. Refer to Section 07 90 05 for testing requirements. Anticipate lead time necessary to perform testing.

F. Preinstallation Conference: Conduct conference at Project site. Prior to the start of the curtain wall work, and at the Contractor's direction, meet at the site and review the construction schedule, availability of materials, installers personnel qualifications, equipment and facilities needed to make progress and avoid delays, installation procedures, testing, inspecting, and certification procedures, and coordination with work.

   1. Meeting shall include Contractor, Owner, curtain wall installer, sealant installer, as well as any other subcontractors or material technical service representatives whose work, or products, must be coordinated with the curtain wall work.

2.05 IDENTIFICATION, DELIVERY, STORAGE, AND HANDLING

A. Comply with applicable provisions of AAMA *Curtain Wall Manual #10* for the care and handling of curtain wall work from shop to site.

B. Identify components of curtain wall work after fabrication by marks clearly indicating location in the building. Packaging of components shall be so selected to protect the components from damage during shipping and handling.

C. Storage on Site:
   1. Store curtain wall components in a location to avoid damage to components. Stack components to prevent bending, excessive pressure, abrasion or permanent damage of component and its finished surfaces.
   2. Store curtain wall components and materials in a clean, dry location, away from uncured concrete, masonry work, and construction activities. Cover with nonstaining waterproof paper, tarpaulin, or polyethylene sheeting in a manner that will permit circulation of air inside the covering.

D. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of metals.

2.06 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of supporting structure by field measurements before fabrication so curtain wall work is accurately designed, fabricated, and fitted to structure. Indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work. Use Contractor's lines and benchmarks as basis for measurements.
   1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating curtain wall work without field measurements. Coordinate supporting structure construction to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Manufacturers:
   1. Manufacturer: Kawneer Company-1600 System 2.
   2. Substitutions: See Section 01 60 00- Product Requirements.

B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
   2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
   3. Extruded Structural Pipe and Tubes: ASTM B 429.
   4. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
   5. Shapes and Thickness: Provide shapes as shown and as required to suit the performance requirements but with wall thickness of not less than the following:
      a. Minimum Wall Thickness for Structural Extrusions: 1/8 inch (3 mm).
      b. Minimum Wall Thickness for Non-Structural Extrusions: 1/16 inch (1.5 mm).

C. Steel Reinforcement: With corrosion resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
   1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
   2. Cold Rolled Sheet and Strip: ASTM A 611.
   3. Hot Rolled Sheet and Strip: ASTM A 570/A 570M.

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

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   2. Reinforce members as required to receive fastener threads.
   3. Use exposed fasteners with countersunk Phillips screw heads.
   4. Finish exposed portions to match framing system.
   5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.

F. Anchors: Three way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

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

H. Exposed flashing at curtain wall openings, jambs and head. Factory painted to match curtain wall frames.

I. Framing Gaskets: Recommended by manufacturer for joint type.

J. Aluminum Entrance Doors and Frames: Refer to Section 084113.

K. Sealant, Glass, and Glazing Materials:
   1. Concealed Sealing Materials: Provide silicone sealing materials for concealed applications within glazed aluminum curtain walls, compatible with and adherent to each material in contact, and recommended by the manufacturer to fulfill performance requirements.
   2. Exposed Sealing Materials: Equal to DOW Corning 791 – one component, medium modulus, neutral curing silicone sealant.
   3. Glass and Glazing Materials: Refer to Section 088000.

L. Condensate Gutters: Provide shop fabricated (preformed) extruded aluminum units of the type, size, and profiles required to form a complete and continuous waterproof and weatherproof gutter system complete with prefabricated corner units, expansion joints, and anchoring devices.

M. Sheet Metal Partition Filler Panels: Form sheet metal filler panels from 0.05 inch thick aluminum sheet for closing ends of gypsum wallboard partitions.
   1. Produce flat, flush surfaces without cracking and grain separation at bends. Incorporate reveals, trim, and concealed anchorages for attachment to adjacent surfaces.

2. Adhesively attach vinyl foam sealant tape to filler panel edges which abut adjacent surfaces to form a continuous seal. Use vinyl foam sealant tape material set onto edge of filler panel.
3. Size uncompressed tape thickness to fit 3/4 inch wide joint indicated with an additional thickness as required to provide a minimum 15% foam compression.
4. Laminate layers of tape recommended by manufacturer to provide a single tape thickness for the joint indicated.
5. Fill interior of panel with sound deadening mineral fiber insulation permanently attached to inside panel faces.
    a. Vinyl Foam Sealant Tape: Closed cell, low density, self adhesive, PVC foam sealant tape of approximately 13 Shore 00 hardness (ASTM D2240) and a density of 6 pcf (ASTM D1667). Norseal V730; Norton Performance Plastics Corp.

N. Thermal Isolators: Provide rigid plastic or nylon isolators of profile and hardness recommended by glazed aluminum curtain wall fabricator, and fabricated to a cross sectional profile to interlock with aluminum extrusions for thermal isolation of exterior window frame snap caps to interior window framing.

O. Slip and Separator Gaskets:
1. Bolted Slip Joints: Nonmetallic, low friction material bearing temperature and moisture resistances and low abrasion properties as required to suit performance requirements.

2.02 FABRICATION

A. Fabricate glazed aluminum curtain walls to the designs, shapes, and sizes shown using materials specified and shown to produce assemblies meeting or exceeding performance requirements. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and work before shipment.

B. Joints in Metal Work: Fit exposed work and match to produce continuity of line and design, with joints accurately fitted for hairline contact and rigidly secured. Where additional rigidity or strength is required to satisfy the performance requirements reinforce curtain wall components with aluminum or carbon steel shapes, bars, and plates.

C. Shop Assembly: To the extent practicable, assemble fitting and assembly work in fabrication shop.
1. Framing members attaching curtain wall components to building supports shall provide for 3 way adjustment to accommodate fabrication and construction tolerances, and allow for thermal and building movements.
2. Provide vents, weepholes and internal water passages in the glazing framing recesses as recommended by the respective glass and framing manufacturers to conduct infiltrating water to the exterior, and to avoid condensation at glass spandrel unit air spaces. Provide weep baffles secured to inside of frame behind vents and weepholes.
3. Provide flush endcaps for mullion extension cap extrusions.
4. Provide provisions for reglazing from interior for vision glass and exterior for spandrel glazing or panels.

D. Exposed Fasteners: Not permitted.

E. Protection of Metals: Wherever dissimilar metals are in contact, except in the case of aluminum in contact with galvanized steel, zinc, separate surfaces with a coating of zinc rich primer, bituminous paint, or separation gaskets as the condition requires. Wherever aluminum comes in contact with concrete surfaces or separate surfaces with coating of zinc rich primer, bituminous paint, or separation gaskets required by condition.

F. Welding: Complete welding of exposed surfaces prior to finishing.

1. Perform welding in accordance with recommendations of AWS and with electrodes and by methods recommended by suppliers of metal being welded. Fabricate welded aluminum assemblies so fraying surfaces are free rinsing and will not trap coating solutions.
2. Make welds behind finished surfaces to eliminate distortion and discoloration, on finished side. Plug, puddle, and spot welding are not permitted. Provide low heat filled welds using chill bar on finished side to eliminate dimpling, distortion, and discoloration on the finished side. If weld heads appear on the finished surface, grind weld head and polished to match and blend with the finish on adjacent parent metal. Weld spatter and welding oxides on finished surfaces shall be removed immediately.
3. At joints where welding cannot be performed use concealed stainless steel fasteners to join assembly.

G. Shop Painting of Carbon Steel: Thoroughly clean ungalvanized steel items cleaned of loose scale, filings, dirt, and foreign matter, in accordance with SSPC SP3 *Power Tool Clean*, and paint with coating specified for carbon steel surfaces.

2.03 FINISH

A. Comply with NAAMM *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

B. Appearance of Finished Work: During production, maintain large size color range samples for use in comparing against production material. Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable.

C. Finish:
1. Architectural Class II Clear Anodic Coating; AA-M12C22A31, AAMA 611..

D. Concealed Metal Surfaces: Provide protective coatings to metal surfaces concealed in construction:
1. Coating for Carbon Steel: Hot dip galvanized, complying with ASTM A123.
2. Coating for Aluminum and Carbon Steel: Where aluminum or carbon steel surfaces are in contact with each other or in contact with dissimilar materials, and where hot dip galvanizing of carbon steel is incompatible with component parts because of galvanic action or component fabrication tolerances provide one of the following:
   a. Bituminous Paint: Cold applied, nonsagging, asphalt mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos. Apply in 2 coats for overall minimum dry film thickness of 25 mils.
   b. Zinc Rich Primer: Organic zinc rich primer, complying with SSPC-Paint 20.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, adjoining construction, and conditions under which the work is installed. Proceed with installation after unsatisfactory conditions have been corrected.
1. Before beginning installation of the glazed aluminum curtain wall work, examine building structural frame and cladding indicated to support the glazed aluminum curtain wall work. Notify Architect in writing of dimensions or conditions which prevent the proper execution of the glazed aluminum curtain wall work, including specified tolerances. Use offset lines and bench marks as basis of measurements.

3.02 PREPARATION

A. Coordinate glazed aluminum curtain wall work with adjacent work and provide items to be placed during the installation of other work at time to avoid delays in the work.

B. Place items, including concealed overhead framing, accurately in relation to the final location of glazed aluminum curtain wall components.

3.03 INSTALLATION

A. Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Remove loose particles present or resulting from fabrication or field cutting and drilling by blowing out joints with oil free compressed air, or by vacuuming joints. Remove protective coatings, oils from cutting and drilling operations, and residue on metallic surfaces with solvents that leave no residue. Do not allow solvent to air dry without wiping. Use lint free towels for wiping of surfaces. Wipe metal surfaces with IPA (isopropyl alcohol) or xylene unless otherwise required by compatibility and adhesion testing results. Seal joints watertight. Clean excess joint sealants from finished surfaces.

1. Cut and trim component parts of the glazed aluminum curtain wall work during erection only with the approval of the manufacturer or fabricator, and in accordance with recommendations. Restore finish completely to protect material and remove evidence of cutting and trimming. Remove and replace members where cutting and trimming has impaired strength or appearance, as directed by Architect.
2. Set components within erection tolerances with uniform joints. Place components on shims and fasten to supporting substrates using bolts and similar fasteners. Use stainless steel shims at structural connections only. U shaped shims at structural connections are not permitted. Use aluminum, stainless steel or high impact polystyrene shims at other connections.
3. Do not erect components that are warped, deformed, bowed, dented, defaced, or damaged and impair strength or appearance. Remove and replace members damaged in process of erection.
4. Coat concealed surfaces of dissimilar materials, and any ferrous metal components, with a heavy coating of bituminous paint, zinc rich primer or other separation in accordance with manufacturer's recommendations. Where aluminum components will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
5. Do not burn, cut into or field drill holes or slots in building framing member without written acceptance of the structural engineer.

B. Glazed Aluminum Curtain Wall, Entrance and Storefront Framing: Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

C. Entrance Doors: Securely anchor doors in place to a straight, plumb and level condition, without distortion. Adjust doors to provide a tight fit at contact points for weathertight closure and to operate smoothly, without binding, with hardware functioning properly. Field test weatherstripping contact and hardware movement and make final adjustment, and lubricate for proper operation and performance of doors.

D. Sheet Metal Partition Filler Panels: Locate and place partition filler panels plumb, level, and in alignment with adjacent construction, with uniform reveals as shown. Provide concealed foam tapes, and install as the installation progresses to make installations acoustically sealed and light tight. Do not penetrate window and curtain wall framing with any type of fastenings.

E. Flashing: Install flashings fabricated from specified flashing material to the profiles shown. Furnish flashings in single piece lengths. Lap seam laps and joints where required by minimum of 4 inches (100 mm) with lap completely embedded in sealant. Use mechanical fasteners where necessary to maintain contact of overlapping elements. Spot heads of fasteners with sealant.

F. Install glazing to comply with requirements of Section 088000.

G. Install perimeter sealant to comply with requirements of Section 079200 and manufacturers installation manual

H. Concealed Sealing Components: Apply sealant and gasket components integral to glazed aluminum curtain wall systems in strict accordance with the each component manufacturers printed instructions. Before applying components remove mortar, dust, dirt, moisture, and foreign matter which are deleterious to intended performance of the component. Mask adjoining exposed surfaces to avoid spilling, dripping, dropping or other unintended contact of the sealing components onto adjacent exposed surfaces.

I. Anchor glazed aluminum curtain wall work to the structure and surrounding cladding in accordance with the accepted shop drawings

J. Weld with electrodes and by methods recommended by manufacturer of material being welded, and in accordance with AWS D1.1 for concealed steel members.
   1. Welds and adjacent metal areas shall be thoroughly cleaned and coated with a single coat of bituminous paint.

3.04 ERECTION TOLERANCES

A. Fabricate and erect glazed aluminum curtain wall systems to accommodate dimensional tolerances of structural frame and surrounding cladding while providing installed tolerances.
   1. Variation from theoretical calculated position as located in plan or elevation in relation to established floors lines, column lines and fixed elements of the structure, including variations from plumb, level, straight and member size: +/- 1/4 inch max in any 20 feet (+/- 6 mm in any 6 m) run, column to column bay, or floor to floor height.
   2. Alignment: Where surfaces abut in line, and meet at corners, limit offset from true alignment to 1/32 inch (.75 mm).
   3. Variation from angle, or plumb, shown: +/- 1/8 inch max in any 10 feet (+/- 3 mm in any 3 m) run or story height, noncumulative.
   4. Variation from slope, or level, shown: +/- 1/8 inch max in any 20 feet (+/- 3 mm in any 6 m) run or column to column bay, noncumulative.
   5. Minimum caulk joint at perimeter is ½" for primary seal

3.05 REMOVAL OF DEBRIS

A. Remove debris caused by, or incidental to, the erection of the glazed aluminum curtain wall work from the site and legally disposed or recycled.

3.06 CLEANING

A. Clean metal surfaces promptly after installation, exercising care to avoid damage to factory finished exposed surfaces.

B. Wash glass on both faces not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer. Remove excess glazing and sealant compounds, dirt, and other substances.

C. Immediately remove any deleterious material from surfaces of aluminum.

3.07 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that glazed aluminum curtain wall work will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware Schedule”.
2. Division 08 Section “Hollow Metal Doors and Frames”.
3. Division 08 Section “Flush Wood Doors”.
4. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
5. Division 08 Section “All-Glass Entrances”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.03 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

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

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.04 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors.

Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.06 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.07 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Ten years for heavy duty floor closers.
4. Two years for shallow depth floor closers.

1.08 MAINTENANCE SERVICE

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

PART 2 - PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.02 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.

d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’7” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

a. Bommer Industries (BO) - LB Series.
b. Hager Companies (HA) - CB Series.
c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

a. Bommer Industries (BO).
b. Hager Companies (HA).
c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

C. Floor Closers: ANSI/BHMA A156.4 certified floor closers. Provide independent and adjustable valves for closing speed, latch speed, and backcheck with built-in dead stop and hold open features as specified. Provide finished cover plates or thresholds as indicated in door Hardware Sets.

1. Manufacturers:

a. Dorma Products (DO).
b. Rixson Door Controls (RF).

D. Pivots: ANSI/BHMA A156.4, Grade 1, certified. Space intermediate pivots equally not less than 25 inches on center apart or not more than 35 inches on center for doors over 121 inches high. Pivot hinges to have oil impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot with the bottom pivot designed to carry the full weight of the door. Pivots to be UL listed for windstorm where applicable.

1. Manufacturers:

    a. Architectural Builders Hardware (AH).
    b. Rixson Door Controls (RF).

2.03 DOOR OPERATING TRIM

A. Flush Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

4. Manufacturers:

    a. Door Controls International (DC).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    c. Trimco (TC).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    c. Trimco (TC).

C. Locking Pull System: Post-mount style door pulls with integrated deadbolt locking system in type and design as specified in the Hardware Sets. Pulls available in multiple head, floor, or combination locking options, with outside keyed rim cylinder operation and inside turn piece

activation. Mounting applications for aluminum, glass, steel and wood doors, with customized sizing and configuration options. Pull finishes include brass, bronze, and stainless steel.

1. Manufacturers:

    a. Dorma Products (DO) – Locking Ladder Series.
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO) – LP Series.

2.04 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.

1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level. Geographical exclusivity to be provided for all security and high security cylinders and UL437 certification where specified.

    a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.

2. Manufacturers:
    a. Sargent Manufacturing (SA) - Degree Series.
    b. Corbin Russwin (RU) – Access 3 Series.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

G. Construction Keying: Provide construction master keyed cylinders.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.05 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) – ML2000 Series.
b. Sargent Manufacturing (SA) – 8200 Series.
c. Schlage (SC) – L9000 Series.
d. Adams Rite (AD)

2.06 AUXILIARY LOCKS

A. Mortise Deadlocks, Large Case: ANSI/BHMA A156.13, Series 1000, Grade 1, certified large case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. One piece stainless steel bolts with a 1" throw. Deadlocks to be products of the same source manufacturer and keyway as other locksets.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ML2000 Series.
b. Sargent Manufacturing (SA) - 8200 Series.
c. Schlage (SC) - L9460 Series.

2.07 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.08 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.

8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
b. Sargent Manufacturing (SA) - 80 Series.
c. Stanley Precision (PR) - Apex 2000 Series.

2.09 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - DC6000 Series.
    b. Sargent Manufacturing (SA) - 351 Series.
    c. Norton Door Controls (NO) - 7500 Series.

C. Floor Closers, (Standard Duty): Offset or center hung sets including cases, bottom arms, walking beam or offset top pivot, cover plates, mounting plates, and accessories required for complete installation. Provide separate valves and closing and latching speeds.

1. Swing: Double acting. Non-handed.
2. Adjustable spring size 1 to 4.
3. Hold Open: Selective, from manufacturer’s standard options
4. Opening Force: ADA Compliant.
5. Manufacturers:

    a. ASSA ABLOY Glass Solutions (GS) – FC 6275 Series.

2.010 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW). Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

    a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

    a. Hiawatha, Inc. (HI).

b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Trimco (TC).

2.011 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Trimco (TC).

2.012 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).

2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

2.013 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.014 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

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

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.04 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.05 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.06 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.07 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

HARDWARE SETS

Set: 1.0
Doors: 103C, 119C, 119D

1 Hardware By Others	Hardware By Door Supplier			

Set: 2.0
Doors: 100A

2 Continuous Hinge	CFMHD1		PE	087100
1 Exit Device, cvr nightlatch	DG1 16 AD8410 106 x 862	US32D	SA	087100
1 Exit Device, cvr	DG1 16 AD8410	US32D	SA	087100
2 Concealed Closer	2033 H-BUMPER	AL	LC	087100
1 Threshold	171A		PE	087100
1 Set Weatherstrip	by Door Manufacturer			
2 Sweep	by Door Manufacturer			
1 Astragal Set	by Door Manufacturer			

Set: 3.0
Doors: 100B

2 Continuous Hinge	CFMHD1		PE	087100
2 Push Bar & Pull	BF15847	US32D	RO	087100
2 Concealed Closer	2033 H-BUMPER	AL	LC	087100
1 Set Weatherstrip	by Door Manufacturer			
2 Sweep	by Door Manufacturer			
1 Astragal Set	by Door Manufacturer			

Set: 4.0
Doors: 101

2 Continuous Hinge	CFMHD1		PE	087100
1 Header Bolt, active	4016		AD	087100
1 Threshold Bolt, active	4015-18-IB	603	AD	087100
1 Header Bolt, inactive	4085-01-IB	603	AD	087100
1 Mortise Deadlock	MS1850SN	628	AD	087100
1 Thumb Turn	4066-01	130	AD	087100
1 Cylinder, mortise	DG1 41 101	US32D	SA	087100
1 Status Indicator	4089-00	130	AD	087100
1 Push Bar & Pull	BF15847	US32D	RO	087100
2 Concealed Closer	2033 H-BUMPER	AL	LC	087100
1 Threshold	171A		PE	087100
1 Set Weatherstrip	by Door Manufacturer			
2 Sweep	by Door Manufacturer			
1 Astragal Set	by Door Manufacturer			

Set: 5.0
Doors: 104A

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK	087100
1 Storeroom Lock	CPC 3 DG1 8204 LNB	US32D	SA	087100
1 Door Closer	CPC SRI 351 CPS H	EN	SA	087100
1 Threshold	253SSFG 36" Aluminum Pan		PE	087100
1 Gasketing	303SNS		PE	087100
1 Rain Guard	346C		PE	087100
1 Sweep	315SSN		PE	087100

Notes: ADHESIVE GASKETING ON INSIDE STOP ALONG WITH STAINLESS STEEL GASKETING STRIPS.

Set: 6.0
Doors: 118A, 118B

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK	087100
1 Exit Device (storeroom)	CPC DG1 8810 ETB	US32D	SA	087100
1 Door Closer	CPC SRI 351 CPS H	EN	SA	087100
1 Threshold	171A		PE	087100
1 Rain Guard	346C		PE	087100
1 Gasketing	2891AS		PE	087100
1 Sweep	3452AV		PE	087100

Set: 7.0
Doors: 118C

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK	087100
1 Exit Device (storeroom)	CPC DG1 8804 ETB	US32D	SA	087100
1 Door Closer	CPC SRI 351 CPS H	EN	SA	087100
1 Threshold	171A		PE	087100
1 Rain Guard	346C		PE	087100
1 Gasketing	2891AS		PE	087100
1 Sweep	3452AV		PE	087100

Set: 8.0
Doors: 120

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK	087100
1 Exit Device (storeroom)	CPC DG1 8804 ETB	US32D	SA	087100
1 Door Closer	CPC SRI 351 CPS H	EN	SA	087100
1 Gasketing	2891AS		PE	087100

Set: 9.0
Doors: 115, 119A

2	Hinge	T4A3386 NRP 4-1/2" x 4-1/2"	US10BE	MK
1	Hinge	T4A3386 QC12 4-1/2" x 4-1/2"	US10BE	MK
1	Electromechanical Lock	DG1 RX 8271-24V LNB fail secure	US10BE	SA
1	Door Closer	4040XP CUSH	DKBRZ	LC
1	Threshold	171D		PE
1	Rain Guard	346D		PE
1	Sweep	3452DV		PE
1	Gasketing	18041DSB		PE
1	ElectroLynx Harness	QC-C1500/C1500P		MK
1	ElectroLynx Harness	QC-CxxxP (sized for hardware/door width)		MK
1	Position Switch	DPS		SU
1	Power Supply	BPS-24-1		SU
1	Viewer for door 119A	622	ANT	RO
1	CARD READER	Wall Reader to be provided by Systems Integrator		

Notes: ACCESS BY AUTHORIZED CARD CREDENTIAL OR MANUAL KEY. ALWAYS FREE EGRESS.

Set: 10.0
Doors: 104B, 107A, 107B, 108, 111, 116

3	Hinge	T4A3386 4-1/2" x 4-1/2"	US10BE	MK
1	Hinge	T4A3386 QC12 4-1/2" x 4-1/2"	US10BE	MK
1	Electromechanical Lock	DG1 RX 8271-24V LNB fail secure	US10BE	SA
1	Door Closer	4040XP REG	DKBRZ	LC
1	Wall Stop	409	US10B	RO
1	Sweep	315DN		PE
1	Gasketing	18041DSB		PE
1	ElectroLynx Harness	QC-C1500/C1500P		MK
1	ElectroLynx Harness	QC-CxxxP (sized for hardware/door width)		MK
1	Position Switch	DPS		SU
1	Power Supply	BPS-24-1		SU
1	CARD READER	Wall Reader to be provided by Systems Integrator		

Notes: ACCESS BY AUTHORIZED CARD CREDENTIAL OR MANUAL KEY. ALWAYS FREE EGRESS

Set: 11.0
Doors: 112, 113

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
1	Push Plate	70C	US32D	RO	087100
1	Door Pull	108	US32D	RO	087100
1	Closer	351 UO H	EN	SA	087100
1	Kick Plate	K1050 10" x 2" LDW 4BE CSK	US32D	RO	087100
1	Wall Stop	409	US32D	RO	087100
1	Gasketing S88D		PE	087100	

Set: 12.0
Doors: 103A, 103B

3 Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
2 Door Pull	RM3301-12 Mtg-Type 5HD	US32D	RO	087100
1 Door Closer	351 P10 H	EN	SA	087100
1 Wall Stop	409	US32D	RO	087100
1 Gasketing	S88D		PE	087100

Set: 13.0
Doors: 110A, 117B

1 Continuous Hinge	CFMHD1		PE	087100
1 Push Bar & Pull	BF15847	US32D	RO	087100
1 Concealed Closer	2033 H-BUMPER	AL	LC	087100
1 Door Stop	441	US26D	RO	087100
1 Gasketing	S88D		PE	087100

Notes: GASKET/SILENCERS BY FRAME SUPPLIER. PROVIDE ADEQUATE TOP RAIL TO MOUNT CLOSER WITHOUT THE USE OF A DROP PLATE.

Set: 14.0
Doors: 117A

2 Continuous Hinge	CFMHD1		PE	087100
2 Push Bar & Pull	BF15847	US32D	RO	087100
2 Concealed Closer	2033 H-BUMPER	AL	LC	087100
2 Door Stop	441	US26D	RO	087100
2 Gasketing	S88D		PE	087100

Notes: GASKET/SILENCERS BY FRAME SUPPLIER. PROVIDE ADEQUATE TOP RAIL TO MOUNT CLOSER WITHOUT THE USE OF A DROP PLATE.

Set: 15.0
Doors: 204

3 Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1 Storeroom Lock	DG1 8204 LNB	US26D	SA	087100

Set: 16.0
Doors: 114

3 Hinge (heavy weight)	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	087100
1 Storeroom Lock	DG1 8204 LNB	US26D	SA	087100
1 Kick Plate	K1050 10" x 2" LDW 4BE CSK	US32D	RO	087100
1 Gasketing	S88D		PE	087100

Set: 17.0
Doors: 119B

3 Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
1 Office Lock	DG1 8205 LNB	US26D	SA	087100
1 Closer	351 UO H	EN	SA	087100
1 Kick Plate	K1050 10" x 2" LDW 4BE CSK	US32D	RO	087100
1 Door Stop	441	US26D	RO	087100
1 Gasketing	S88D		PE	087100

Set: 18.0
Doors: 202, 203

3 Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	087100
1 Office Lock	DG1 8205 LNB	US26D	SA	087100
1 Closer	351 UO H	EN	SA	087100
1 Door Stop	441	US26D	RO	087100
1 Gasketing	S88D		PE	087100

Notes: GASKET/SILENCERS BY FRAME SUPPLIER. PROVIDE ADEQUATE TOP RAIL TO MOUNT CLOSER WITHOUT THE USE OF A DROP PLATE. WIDE STILE REQUIRED FOR LOCKSET SPECIFIED.

Set: 19.0
Doors: 109

1 Hardware By Others	Hardware By Door Supplier			

Set: 20.0
Doors: 201

1 Continuous Hinge	CFMHD1		PE	087100
1 Office Lock	DG1 8205 LNB	US26D	SA	087100
1 Concealed Closer	2033 H-BUMPER	AL	LC	087100
1 Door Stop	466-RKW	Black	RO	087100

Set: 21.0
Doors: MISC

1 BITTING LIST	KEY RECORDS	SA	
1 KEY BLANKS	BOX OF 50	SA	
1 Key Cabinet	Sized per specification documents	LU	
1 Knox Box	Knox Box (coordinate with local fire station for requirements and location)		

Notes: KNOX BOX AS DIRECTED BY FIRE MARSHAL.

END OF SECTION

SECTION 08 80 00

GLASS AND GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Monolithic vision glass.

B. Low-E insulated vision glass.

C. Low-E insulated translucent glass.

D. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

B. Section 06 41 00 - Architectural Wood Casework: Cabinets and slotted wall system with requirements for glass shelves.

C. Section 07 25 00 - Weather Barriers.

D. Section 07 90 05 - Joint Sealers: Sealant and back-up material.

E. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed doors and borrowed lites.

F. Section 08 14 16 - Flush Wood Doors: Glazed doors.

G. Section 08 43 13 - Aluminum-Framed Storefronts. H.

Section 08 44 13 - Glazed Aluminum Curtain Walls.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C 1036 - Standard Specification for Flat Glass.

E. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.

F. ASTM C 1193 - Standard Guide for Use of Joint Sealants.

G. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.

H. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation. I.

GANA (GM) - GANA Glazing Manual; Glass Association of North America.

J. GANA (SM) - FGMA Sealant Manual; Glass Association of North America.

1.04 SUBMITTALS

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

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples: Submit two samples 12 x 12 inch in size of glass units, showing coloration and design.

E. Samples: Submit 6 inch long bead of glazing sealant, selected color.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Regulatory Requirements: Glass fabricator is responsible for determining specific glass strengths and thicknesses. Strengths and thicknesses indicated on Drawings and specified in this Section are minimum only. Manufacturer's "glass sizing and thickness charts" shall take precedence over Drawings only where charts indicate thicker or stronger glass.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

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

B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 GLAZING TYPES

A. Note: Provide tempered or heat strengthened glass as indicated on drawings or as required by local building codes.

B. **Type GL-1 - Clear Insulated Low-E Vision Glass Units**: 1 inch thick unit constructed of ¼ inch clear exterior light, ½ inch air space, and ¼ inch interior light; low-emissivity coating on No. 2 surface, both lights heat strengthened (tempered where necessary to comply with local code requirements)

1. Application(s): Exterior glazing unless otherwise indicated.
2. Acceptable Manufacturers and Product:
   a. PPG Solarban 60 Starphire + Starphire.
3. Total visible light transmittance: 70 percent, minimum.
4. Outside reflectance: 12 percent maximum.
5. Total solar heat gain coefficient: 0.41 percent maximum.
6. Glazing Method: Exterior wet/dry method, preformed tape and sealant.

C. **Type GL-2 – Translucent Insulating Low-E Glass Units**: 1 1/16 inch thick unit constructed of ¼ inch clear exterior light, ½ inch air space, and 5/16 inch laminated translucent interior light; low emissivity coating on No. 2 surface, both lights heat strengthened (tempered where necessary to comply with local code requirements).
   1. Application(s): Exterior glazing as indicated.
   2. Manufacturer and Product: PPG Solarban 60 Starphire + Starphire with laminated translucent interior light.
      a. Translucent .030 inch PVB Interlayer: Dupont Butacite 65 percent translucent white.
   3. Total Visible Light Transmittance: 50 percent minimum.
   4. Total Solar Heat Gain Coefficient: 0.34 percent maximum.
   5. Glazing Method: Exterior wet/dry method, preformed tape and sealant.

D. **Type GL-3 – Clear Monolithic Single Vision Glazing (Interior Storefront and Exterior/Interior Framed Doors)**:
   1. Applications: Glazing at exterior doors; interior glazing in storefront frames, glazed lites in doors.
   2. Type: Fully tempered float glass.
   3. Thickness: 1/4 inch.
   4. Glazing Method: Gasket glazing.

2.02 EXTERIOR GLAZING ASSEMBLIES

A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with local code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Thicknesses listed are minimum.

B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure air barrier:
   1. In conjunction with air barrier and joint sealer materials described in other sections.
   2. To maintain a continuous air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.03 GLASS MATERIALS

A. Float Glass Manufacturers:
   1. AGC Flat Glass North America, Inc: www.afgglass.com.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc: www.pilkington.com.
   4. PPG Industries, Inc: www.ppg.com. (Basis of Design)
   5. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed Type: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C 1048.
   3. Tinted Types: Color and performance characteristics as indicated.
   4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

C. Laminated Wired Glass: UL- or WH-listed as fire-protection-rated glazing and complying with 16 CFR 1201 test requirements for Category II with or without the use of a surface-applied film.

2.04 SEALED INSULATING GLASS UNITS

A. Manufacturers:
   1. Any of the manufacturers specified for float glass.
   2. Viracon, Apogee Enterprises, Inc: www.viracon.com.
   3. Cardinal Glass Industries: www.cardinalcorp.com.
   4. Guardian Industries Corp: www.guardian.com.

5. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Sealed Insulating Glass Units: Types as indicated.
   1. Locations: Exterior, except as otherwise indicated.
   2. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
   3. Edge Spacers: Aluminum, bent and soldered corners.
   4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   5. Purge interpane space with dry hermetic air.

2.05 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
   3. Pecora Corporation: www.pecora.com.
   4. BASF Construction Chemicals-Building Systems: www.chemrex.com.
   5. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.

C. Silicone Sealant: Single component; chemical curing; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

2.06 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on rlease paper; size as required; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; color as selected.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

E. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. 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.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

F. Fill gap between glazing and stop with required sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

G. Apply cap bead of required sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.06 SCHEDULE - See Drawings

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Gypsum wallboard.

E. Impact rated gypsum wallboard.

F. Ceiling board.

G. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior metal stud framing.

B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

C. Section 07 21 00 - Thermal Insulation: Acoustic insulation.

D. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.

E. Section 07 90 05 - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS

A. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

B. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members.

C. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

D. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.

E. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

F. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

G. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board.

H. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

I. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association.

1.04 SUBMITTALS

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

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

C. Test Reports: For all stud framing products that do not comply with ASTM C 645 or C 754,

provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain gypsum board products, joint treatment products, and textured coatings from a single manufacturer.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C 840 and GA-216.

B. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clark Western Building Systems: www.clarkwestern.com.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Marino\Ware: www.marinoware.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
   2. Studs: "C" shaped with flat or formed webs with knurled faces.
   3. Runners: U shaped, sized to match studs.
   4. Ceiling Channels: C shaped.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

C. Exterior Studs for Application of Gypsum Board: As specified in Section 05 40 00.

D. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.

E. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Georgia-Pacific Gypsum LLC: www.gp.com/gypsum.
   3. Lafarge North America Inc: www.lafargenorthamerica.com.
   4. National Gypsum Company: www.nationalgypsum.com.
   5. USG Corporation: www.usg.com.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces, unless otherwise indicated.
   2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
   4. Paper-Faced Products:
      a. CertainTeed Corporation; ProRoc Brand Gypsum Board.
      b. Georgia-Pacific Gypsum LLC; ToughRock Gypsum Wallboard.

c. Lafarge North America Inc; Regular Drywall and Firecheck Type X and Type C.
d. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
e. USG Corporation; Sheetrock Brand Gypsum Panels.
f. Substitutions: See Section 01 60 00 - Product Requirements.

C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C 1396/C 1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
2. Type: Regular, in locations indicated.
3. Regular Board Thickness: 1/2 inch.
4. Edges: Tapered.
5. Products:
a. CertainTeed Corporation; ProRoc Brand Moisture Resistant Gypsum Board ("Greenboard").
b. Georgia-Pacific Gypsum LLC; ToughRock Moisture-Guard Gypsum Board ("Greenboard").
c. Lafarge North America Inc; Watercheck ("Greenboard").
d. Lafarge North America Inc; Mold Defense Drywall.
e. National Gypsum Company; Gold Bond Brand XP Gypsum Board.
f. USG Corporation; Sheetrock Brand Mold Tough Gypsum Panels.
g. Substitutions: See Section 01 60 00 - Product Requirements.

D. Impact-Rated Wallboard: Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C1629.
1. Application: Parts Department, Break Room, Service Drive.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Unfaced Type: Interior fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M.
4. Type: Fire-resistance rated Type X, UL or WH listed.
5. Thickness: 5/8 inch (16 mm).
6. Edges: Tapered.
7. Products:
a. National Gypsum Company; High Impact XP Gypsum Board
b. Temple-Inland Inc; ComfortGuard IR Impact Resistant.
c. USG Corporation; Fiberock Brand Panels--VHI Abuse-Resistant.

E. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
2. Thickness: 1/2 inch.
3. Edges: Tapered.
4. Products:
a. CertainTeed Corporation; ProRoc Interior Ceiling.
b. Georgia-Pacific Gypsum LLC; ToughRock CD Ceiling Board.
c. Lafarge North America Inc; Sagcheck.
d. National Gypsum Company; High Strength Brand Ceiling Board.
e. USG Corporation; Sheetrock Brand Sag-Resistant Interior Gypsum Ceiling Board.
f. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ACCESSORIES

A. Acoustic Insulation: As specified in Section 07 21 00.

B. Acoustic Sealant: As specified in Section 07 90 05.

C. Finishing Accessories: ASTM C 1047, galvanized steel or rolled zinc, unless otherwise indicated.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
2. Ready-mixed vinyl-based joint compound.

E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

F. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C 1002; self-piercing tapping type.

G. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C 754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated, or if not indicated, as follows:
1. Hanger Wire: Hanger wire shall be anchored securely to structural steel frame, or to approved anchors in concrete slabs. Space hangers not over 4 feet o.c. in direction of main runner channels, and as specified for runner spacing at right angles to main runners. Provide hanger within 6 inches of ends of main runner runs and of boundary walls, girders or similar interruption of ceiling continuity.
2. Main Runners: Main runners shall be properly positioned and leveled, and hangers shall be saddle-tied along runner. Place main runners not over 4 feet o.c. Hangers shall be attached directly to building structural system and/or floor or roof deck above. In no case will hanging from building mechanical systems, duct, piping, conduit, etc., be permitted. Where interference from building systems does not permit proper attachment of hangers to the building, provide bridging under such items to support hangers at proper spacing. For spaces up to 5 feet, use 2 inch cold-rolled channels as bridging; for spaces over 5 feet, use 20 gage metal studs sized as appropriate for the required space.
3. Level ceiling system to a tolerance of 1/600.
4. Install bracing as required at exterior locations to resist wind uplift.

C. Studs: Space studs at 16 inches on center unless otherwise noted.
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.
3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

D. Openings: Reinforce openings as required for weight of doors using not less than double studs at jambs.

E. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
1. Orientation: Horizontal.
2. Spacing: As indicated.

F. Blocking: Install wood blocking for support of:
   1. Wall mounted cabinets.
   2. Plumbing fixtures.
   3. Toilet partitions.
   4. Toilet accessories.
   5. Wall mounted door hardware.

3.03 BOARD INSTALLATION

A. Comply with ASTM C 840. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Installation on Metal Framing: Use screws for attachment of all gypsum board.

E. Installation of Gypsum Board Above Ceilings:
   1. Provide gypsum board on both faces of steel stud partition framing above ceilings and in similar concealed spaces as scheduled or as required by governing building codes for all fire rated partitions.
   2. Seal joints with regular tape and compound. Carry gypsum board tight against structure or deck and seal. Gypsum board shall be cut to closely follow the configuration of the deck and sealed.

F. Identification of Smoke and Fire Rated Walls: In accordance with building codes, provide proper identification of smoke and fire rated walls above all ceilings. Wall identification for both smoke and fire ratings shall be on both sides of wall.

G. Special Conditions: Where electrical or similar panels, fire hose or extinguisher cabinets, recessed water coolers or such similar accessories 16 sq. in. or greater occur within one or two hour constructed walls, rated walls shall be framed and constructed continuously and uninterrupted behind and around such accessories without compromise to the integrity of the wall.

H. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
   1. Not more than 30 feet apart on walls over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.05 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C 840, as follows:
   1. Level 4: Walls to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish, applied graphics, and other areas specifically indicated.
   3. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
   4. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project.

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.

D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00

TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Porcelain tile for floor applications.

B. Tile for wall applications.

1.02 RELATED REQUIREMENTS

B. Section 07 90 05 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar.
   4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.
   5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
   6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
   7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
   8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
   9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
   10. ANSI A118.1 - American National Standard Specifications for Dry-Set Portland Cement Mortar.
   11. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar.
   12. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation.
   13. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile.
   14. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.

B. TCNA (HB) - Handbook for Ceramic Tile Installation.

1.04 SUBMITTALS

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

B. Samples: Submit three samples of following materials to Architect for approval.
   1. Panels of not less than four tiles for each color and type of floor and wall tile.
   2. Samples of each trim shape and each accessory specified.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.05 QUALITY ASSURANCE

A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not install adhesives in an unventilated environment.

B. Maintain ambient and substrate temperature of a minimum 50 degrees F during installation of mortar materials to prevent rapid evaporation of moisture.

C. Provide 2 percent of each size, color, and surface finish of tile specified in clear marked cartons for Owner's use.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: Per Finish Schedule and Below:
   1. Atlas Concorde: www.atlasconcorde.com
   2. American Olean: www.americanolean.com
   3. Daltile: www.daltile.com
   4. Interceramic: www.interceramicusa.com
   5. Substitutions: See Section 01 60 00 – Product Requirements.

B. Porcelain Floor Tile: ANSI A137.1, and as follows:
   1. Moisture Absorption: 0.5 to 3.0 percent.
   2. Size and Shape: See Finish Schedule.
   3. Edges: Square.
   4. Color: See Finish Schedule.
   5. Trim Units: Matching bead, cove, and surface bullnose shapes in sizes coordinated with field tile. Refer to Finish Plan for locations.

C. Wall Tile: ANSI A137.1, and as follows:
   1. Moisture Absorption: 3.0 to 7.0 percent.
   2. Size and Shape: See Finish Schedule.
   3. Edges: Square.
   4. Color: See Finish Schedule.
   5. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile. Refer to Finish Plan for locations.

D. Base: Same as floor tile.
   1. Length: Same as tile length.
   2. Top Edge: Bullnosed.
   3. Internal Corner: Coved.
   4. External Corner: Bullnosed.

2.03 ADHESIVE MATERIALS

A. Manufacturers:
   1. Bonsal American, Inc; StayFlex 590: www.prospec.com
   2. Bostik Inc; Product 7001 Mastic: www.bostik-us.com.
   3. Mapei Corporation: www.mapei.com.
   4. Custom Building Products; Product Custom Bond Type I Organic Adhesive.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.

C. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied.

2.04 WATERPROOFING/CRACK ISOLATION MEMBRANE

A. Waterproofing/Anti-Fracture Membrane meeting ANSI A118.10 and A118.12:
   1. Laticrete International, Inc.; Hydro Ban.
   2. MAPEI Coporation; AquaDefense.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 MORTAR MATERIALS

A. Manufacturers:
   1. Bonsal American, Inc; Permalastic System: www.prospec.com
   2. Bostik Inc; Product Hydroment PM: www.bostik-us.com.
   3. Custom Building Products; Product Master-Blend Thin Set Mortar: www.custombuildingproducts.com.
   4. Mapei Corporation: www.mapei.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Mortar Bed Materials: Portland cement, sand, latex additive and water.

C. Mortar Bond Coat Materials:
   1. Dry-Set Portland Cement type: ANSI A118.1.
   2. Latex-Portland Cement type: ANSI A 118.4, ANSI A118.15.

2.05 GROUT MATERIALS

A. Tile Grout Manufacturers:
   1. Mapei Corporation: www.mapei.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Standard Grout: Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7.
   1. Colors: As indicated in Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

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 tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

B. Request tile pattern. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install ceramic accessories rigidly in prepared openings.

G. Install thresholds where indicated.

H. Sound tile after setting. Replace hollow sounding units.

I. Allow tile to set for a minimum of 48 hours prior to grouting.

J. Grout tile joints. Use standard grout unless otherwise indicated.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA Handbook Method F113, dry-set or latex-portland cement bond coat, with standard grout, unless otherwise indicated.

3.05 INSTALLATION - WALL TILE

A. Over gypsum wallboard on metal studs install in accordance with TCNA Handbook Method W243, thin-set with dry-set or latex-portland cement bond coat, unless otherwise indicated.

3.06 CLEANING

A. Clean tile and grout surfaces according to tile and grout manufacturer's printed instructions, but not sooner than fourteen (14) days after installation.

3.07 PROTECTION

A. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior suspended metal grid ceiling system.

B. Interior acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 07 21 00 - Thermal Insulation: Acoustical insulation.

B. Section 07 90 05 - Joint Sealers: Acoustical sealant.

1.03 REFERENCE STANDARDS

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C 636/C 636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. CISCA - "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies: Seismic Zones 0-2".

D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products.

1.04 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: Submit two samples illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 12 inches long, of suspension system main runner.

1.05 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

B. Provide one box of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Acoustical Units - General: ASTM E 1264, Class A.

C. Acoustical Tile: See Finish Schedule.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. Chicago Metallic Corporation: www.chicagometallic.com.
   4. USG: www.usg.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System Type 1: Formed hot-dipped galvanized steel, commercial quality cold rolled, with painted finish; heavy-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: Painted, color as selected.
   4. Locations: Back of house areas; refer to Drawings.

C. Exposed Steel Suspension System Type. 2: Formed hot-dipped galvanized steel, commercial quality cold rolled, with painted finish; heavy-duty.
   1. Profile: Tee; 9/16 inch wide face.
   2. Finish: Painted, color as selected.
   3. Locations: Public areas; refer to Drawings.

D. Exposed Aluminum Suspension System: Extruded aluminum; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Finish: Painted white.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Acoustical Insulation: Specified in Section 07 21 00.

D. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 90 05.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Comply with International Building Code requirements for Seismic Category C.

D. Comply with CISCA "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies: Seismic Zones 0-2".

E. Install according to reflected plans and manufacturers printed instructions. Unless indicated otherwise, ceilings shall be laid out symmetrically in each space, with no less than half panel or tile at walls.

F. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

G. Hangers shall be attached directly to building structural system and/or floor or roof deck above. In no case will hanging from building mechanical systems, duct, piping, conduit, etc., be permitted. Where interference from building systems does not permit proper attachment of hangers to the building, provide bridging under such items to support hangers at proper spacing. For spaces up to five feet use 2 inch cold-rolled channels as bridging. For spaces over five feet, use 20 ga. metal studs sized as appropriate for the required space.

H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

J. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

K. Do not eccentrically load system or induce rotation of runners.

L. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

M. Suspension system, including wall mould, shall be level to within 1/8 inch in 12 feet, with ceiling panels in place.

N. Exposed grid members shall be straight and in alignment. All exposed surfaces shall be flush and level.

3.03 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 units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on each panel to retain panels tight to grid system at exterior locations.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 CLEANING

A. Following installation, clean all soiled and discolored surfaces. Remove and replace units which are damaged or improperly installed.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient base.

B. Installation accessories.

1.03 REFERENCE STANDARDS

A. ASTM F 1861 - Standard Specification for Resilient Wall Base.

B. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant; Federal Specifications and Standards.

1.04 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. Verification Samples: Submit two samples, 2 x 2 inch in size illustrating color and pattern for each resilient product specified.

D. Maintenance Data: Include three (3) copies of maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.03 RESILIENT BASE

A. Resilient Base: ASTM F 1861, Type TP rubber, thermoplastic formulation; Straight, or Cove as scheduled, and as follows:
   1. Straight at carpet locations, cove at exposed concrete and rubber flooring locations.
   2. Height: 4 inch.
   2. Thickness: 0.125 inch thick.
   3. Finish: Satin.
   4. Length: Roll.
   5. Color: See Finish Schedule.
   6. Manufacturers: Per Finish Schedule and Below:
      a. Burke Flooring: www.burkemercer.com.
      b. Johnsonite, Inc: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ACCESSORIES

A. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. 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.

3.02 PREPARATION

A. Clean substrate.

B. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.05 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold.

C. Install base on solid backing. Bond tightly to wall and floor surfaces. Use only 20 foot lengths. Seams on walls less than 20 feet long will not be acceptable.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 65 19

RESILIENT TILE FLOORING (LVT)

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Resilient Luxury Vinyl Tile Flooring and related accessories.

B. Related Sections: Section(s) related to this section include:
   1. Concrete: Refer to Section 03 33 00
   2. Resilient Base: Refer to Section 09 65 00.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM F 1303 Standard Specification for Sheet Vinyl Floor Covering with Backing
   2. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
   3. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
   4. ASTM F 1861 Standard Specification for Resilient Wall Base
   5. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
   6. ASTM F 1482 Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
   7. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
   8. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
   9. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
   10. ASTM E 492 Standard Test Method for Laboratory Measurement of lmpact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
   11. ASTM E 989 Standard Classification for Determination of lmpact lnsulation Class (llC)

B. National Fire Protection Association (NFPA):
   1. NFPA 253 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
   2. NFPA 258 Test Method for Specific Optical Density of Smoke Generated by Solid Materials

C. Standards Council of Canada
   1. CAN/ULC S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.

1.4 SUBMITTALS

A. General: Submit listed submittals in accordance with "Conditions of the Contract" and Division 1 Submittal Procedures Section.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.

C. Samples: Submit selection and verification samples for finishes, colors, and textures.

D. Closeout Submittals: Submit the following:
   1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
   2. Warranty: Warranty documents specified herein.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

B. Regulatory Requirements:

1. Fire Performance Characteristics: Provide resilient linoleum sheet flooring with the following fire performance characteristics as determined by testing products in accordance with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction:
   a. Critical Radiant Flux: Class 1 Rating per NFPA 253 (ASTM E 648) (0.45 watts/cm² or greater).
   b. Smoke Density: Less than 450 per NFPA 258 (ASTM E 662).

C. Pre-Installation Testing: Conduct pre-installation testing as follows: [Specify testing (bond testing, pH testing, calcium chloride testing, relative humidity testing, etc.)]

1.6 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirements Sections.

B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1. Material should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational, controlled and set at a minimum of 68º F (20º C) for at least 48 hours prior to the installation.

1.7 PROJECT CONDITIONS

A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations, areas to receive flooring should be clean, fully enclosed and weather tight. The permanent HVAC must be fully operational, controlled and set at a minimum of 68° F (20° C) for a minimum of seven days prior to, during, and seven days after the installation. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring, and for final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 68 ° F (20° C) for a minimum of seven days prior to, during, and seven days after the installation.

C. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 SEQUENCING AND SCHEDULING

A. Finishing Operations: Install flooring after finishing operations, including painting and ceiling operations, have been completed.

B. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by resilient flooring manufacturer's recommended bond testing, moisture testing, and pH testing.

1. Flooring Contractor assigned to report back to owner/architect.

1.9 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1. Warranty Period: Five (5) year limited warranty commencing on Date of Substantial Completion.

1.10 MAINTENANCE

A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals (Maintenance Materials) Section.
1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 RESILIENT LUXURY VINYL TILE

A. Manufacturers:.
1. Milliken: Quietlife.
2. OneFlor USA: Setagrip.

B. Refer to Drawings for size, pattern, and color.

2.2 PRODUCT SUBSTITUTIONS

A. Substitutions: See Section 01 60 00 – Product Requirements.

2.3 RELATED MATERIALS

A. Related Materials: Refer to other sections for related materials as follows:
   1. Underlayment and Patching Compound: Refer to Division 3 Concrete Sections for Portland cement based underlayments and patching compounds.
   2. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient flooring accessories.

2.4 SOURCE QUALITY

A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (bond testing, pH testing, calcium chloride testing, relative humidity testing, etc.).

B. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed and shall not be considered as a legitimate claim.

3.3 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

B. Surface Preparation:
   1. General: Prepare floor substrate in accordance with manufacturer's instructions.
   2. Floor Substrate: Floors shall be sound, smooth, flat, permanently dry, clean, and free of all foreign materials including, but not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue.
   3. Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3,000 psi. Refer to Division 3 Concrete sections for patching and repairing crack materials and leveling compounds with Portland cement based compounds.
      a. Reference Standard: Comply with the latest version of ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

C. Concrete Moisture Testing: Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with the latest version of ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with the latest version of ASTM F 2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. Concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo V 885 adhesive. Concrete internal relative humidity must not exceed 85% when using Forbo V 885 adhesive. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.

D. Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. The surface pH of concrete slabs must not exceed a pH of 10. Concrete substrates with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.

3.4 INSTALLATION

A. Material Installation: Begin laying tiles at the starting point, ensuring that the tile is laid exactly along the layout lines. Because the tiles must be installed into wet adhesive, do not spread the adhesive in an area larger that the tile can be installed while the adhesive is still wet. The successful installation of border tiles is best accomplished by following one of two strategies. (1) When laying out tile, determine the edge of a field tile a comfortable distance from each wall and then snap chalk lines around the perimeter of the room. When spreading adhesive, use these lines as a guide to stop spreading adhesive and install the field tile up to the adhesive spread lines. Once the field tiles have been installed, the border tiles and be "dry" fitted (before spreading the adhesive). After the border tiles have been cut, adhesive can be applied in the area of the border tiles and the tiles can be placed immediately into the wet adhesive. (2) Plan the sequence of spreading adhesive so that the border tiles can be cut and placed into the adhesive before the adhesive working time has been exceeded. Immediately after installation, roll the tile with a 100 pound three-section roller in both directions and repeat as necessary to ensure adequate transfer of adhesive to the backing.

B. Adhesive Installation: Use trowel as recommended by flooring manufacturer for specific adhesive (1/32" x 1/16" x 1/32" U notch trowel). Spread rate is approximately 175 ft^2/gallon.

C. Installation Techniques:
   1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
   2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
   3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
   4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
   5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
   6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
      a. Use adhesive applied to substrate in compliance with manufacturer's recommendations, including those for mixing, trowel notch, and adhesive open and working times.
   7. Roll resilient flooring as required by resilient flooring manufacturer.

D. Finish Flooring Patterns: Refer to Drawings.

3.5 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
   1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
   2. Sweep and vacuum floor after installation.
   3. Do not wash floor until after time period recommended by flooring manufacturer.
   4. Damp mop flooring to remove black marks and soil.

3.6 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.7 INITIAL MAINTENANCE PROCEDURES

A. General: Include in Contract Sum Amount cost for initial maintenance procedures, and execute procedures after flooring installation as recommended by flooring manufacturer.

B. Initial maintenance to be conducted by awarded Flooring Contractor using a Certified Forbo Floor Care Technician.

END OF SECTION

SECTION 09 67 23
RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes resinous flooring system with epoxy body, and non-slip texture.
   1. Application Method: Metal, power, or hand troweled.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Verification: For each resinous flooring system required, 5 inches (150 mm) square, applied to a rigid backing.

C. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

D. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e., epoxy mortar-based system). Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.

B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
   2. Contractor shall have completed at least 10 projects of similar size and complexity.

C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
      a. Include 48-inch (1200-mm) length of integral cove base.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data sheet.

C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and Retain the Subparagraph below when specifying Stonhard, Inc.'s Stonblend RTZ.
   1. Maintain material and substrate temperature between 65 and 85 deg F (18 and 30 deg C) during resinous flooring application and for not less than 24 hours after application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

D. Concrete substrate shall be properly cured. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.7 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full year from date of installation or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 RESINOUS FLOORING

A. Acceptable Manufactures,
   1. Stonhard: (Basis of design), www.stonhard.com
   2. Res-Tek, Inc.; www.res-tek.net

B. Products: Subject to compliance with requirements:
   1. Stonhard, Inc.; Stonclad GS®. With topcoat Stonkote GS4.

C. System Characteristics:
   1. Color and Pattern: As selected by Architect from manufacturer's standard colors.
   2. Wearing Surface: Non-slip fine sand texture.
   3. Integral Cove Base: 4 inches.
   4. Overall System Thickness: nominal 1/4"

D. System Components: Manufacturer's standard components that are compatible with each other and as follows:
   1. Primer:
      a. Material Basis: Stonhard Standard Primer
      b. Resin: Epoxy
      c. Formulation Description: (2) two component, 100 percent solids.
      d. Application Method: Squeegee and roller.
      e. Number of Coats: (1) one.
   2. Mortar Base:
      a. Material design basis: Stonclad GS
      b. Resin: Epoxy.
      c. Formulation Description: (3) three component, 100 percent solids.
      d. Application Method: Metal Trowel.
         1) Thickness of Coats: nominal 1/4 inch (6.4 mm).
         2) Number of Coats: One.
      e. Aggregates: Pigmented Blended aggregate.
   3. Top Coat:
      a. Material design basis: Stonkote GS4
      b. Resin: Epoxy.
      c. Formulation Description: (2) two component 100 percent solids.
      d. Type: pigmented.
      e. Finish: Standard.
      f. Number of Coats: one.

E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
   1. Compressive Strength: 10,000 psi after 7 days per ASTM C 579.
   2. Tensile Strength: 1,750 psi per ASTM C 307.
   3. Flexural Strength: 4,000 psi per ASTM C 580.
   4. Water Absorption: < 1% per ASTM C 413.
   5. Impact Resistance: > 160 in. lbs. per ASTM D 2794.
   6. Flammability: Class 1 per ASTM E-648.
   7. Hardness: .85 to .90, Shore D per ASTM D 2240.
   8. Flexural Modulus of Elasticity: 2.0×10^{6} psi per ASTM C-580
   9. Thermal Coefficient of Linear Expansion: 1.4×10^{-5} in./in.˚F per ASTM C-531

2.2 ACCESSORY MATERIALS

A. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, and dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
   1. Mechanically prepare substrates as follows:
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup or Diamond grind with a dust free system.
   2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
   3. Verify that concrete substrates meet the following requirements.
      a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
      b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 6 lb of water/1000 sq. ft. of slab in 24 hours.

C. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

D. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
   1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
   2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
   3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
      a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Stonclad GS mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.
   1. Integral Cove Base: 4 inches high.

D. Apply metal trowel single mortar coat in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

E. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 TERMINATIONS

A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.

B. Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.

C. Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

D. Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.4 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.

B. Treat cold joints and construction joints and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

C. Vertical and horizontal contraction and expansion joints are treated by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General contractor responsible for cleaning prior to inspection.

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.2 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

D. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.3 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, colors available, and method of installation.

C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

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.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.5 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Tile Carpeting:
   1. Shaw Contract.
   2. Mannington Commercial.
   3. Bentley.
   4. Substitutions: None permitted.

2.2 MATERIALS

A. Tile Carpeting: Tufted, manufactured in one color dye lot.
   1. Product and Manufacturer: As indicated on Drawings.
   2. Color: As indicated in Drawings.
   3. Tile Size and Pattern: As Indicated in Drawings.

2.3 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: As Indicated in Drawings.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
   1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

3.3 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

F. Fully adhere carpet tile to substrate.

G. Trim carpet tile neatly at walls and around interruptions.

H. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 77 20

FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets adhered to unfinished gypsum wallboard.
   1. PVC trim.
   2. PVC Wall base.

B. Products Not Furnished or Installed under This Section:
   1. Gypsum substrate board.
   2. Resilient Base.

1.02 RELATED SECTIONS

A. Section 09 21 16 – Gypsum Board Assemblies.

B. Section 05 40 00 - Cold Formed Metal Framing.

C. Section 09 90 00 – Paints and Coatings.

D. Section 09 65 00 - Resilient Flooring.

1.03 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM)
   1. ASTM D 256 - Izod Impact Strengths (ft #/in)
   2. ASTM D 570 - Water Absorption (%)
   3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
   4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
   5. ASTM D 2583- Barcol Hardness
   6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
   1. Submit complete with specified applied finish.
   2. For selected patterns show complete pattern repeat.
   3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives and sealants prior to their delivery to the site.

1.05 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
      a. Wall Required Rating – Class A.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (70°) for 48 hours prior to installation.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.08 WARRANTY

A. Furnish one year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Marlite; 202 Harger Street, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com.

B. Product:
1. Standard FRP with Sani-Coat.

2.02 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
1. Coating: Multi layer print, primer and finish coats.
2. Dimensions:
   a. Thickness – 0.090 inch (2.29mm) nominal
   b. Height on wall - 4'-0" (1.22m) nominal
3. Tolerance:
   a. Length and Width: +/-1/8 inch (3.175mm)
   b. Square - Not to exceed 1/8 inch for 8 foot (2.4m) panels or 5/32 inch (3.96mm) for 10 foot (2.4m) panels

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
1. Flexural Strength - 1.0 x 10^4 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
2. Flexural Modulus - 3.1 x 10^5 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
3. Tensile Strength - 7.0 x 10^3 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
4. Tensile Modulus - 1.6 x 10^5 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
5. Water Absorption - 0.72% per ASTM D 570.
6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Finish:
   a. Color: 100 White
   b. Surface: Pebbled.

c. Fire Rating: Class A

2.03 BASE

A. Marlite Base Molding for 0.090 inch (2.29mm) thick FRP Panels
   1. Color: Black.
   2. Profiles:
      a. M 612 FRP Base Molding
      b. Corners and caps as required.

2.04 MOLDINGS

A. PVC: Extruded PVC Trim Profiles for .090 inch thick panels.
   1. Color: White.

B. Outside Corner Guard:
   1. M 961 PVC
      a. 199 White

2.05 ACCESSORIES

A. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
   1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive
   2. Marlite C-375 Construction adhesive flexible, water-resistant, solvent based adhesive formulated for fast, easy application.

C. Sealant:
   1. Marlite Brand MS-250 Clear Silicone Sealant
   2. Marlite Brand MS-251 White Silicone Sealant
   3. Marlite Brand - Color Match Sealant,

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
   1. Verify that stud spacing does not exceed 24 inch (61cm) on-center.

B. Repair defects prior to installation.
   1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.02 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8” inch (3 mm) clearance for every 8 foot (2.43m) of panel.
   1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
   2. Pre-drill fastener holes 1/8 inch (3.175mm) oversize with high speed drill bit.
      a. Space at 8 inches (20.32cm) maximum on center at perimeter, approximately 1 inch from panel edge.
      b. Space at in field in rows 16 inches (40.64cm) on center, with fasteners spaced at 12 inches (30.48 cm) maximum on center.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
   1. Install panels with manufacturer's recommended gap for panel field and corner joints.
      a. Adhesive trowel and application method to conform to adhesive manufacturer’s recommendations.
      b. Drive fasteners for snug fit. Do not over-tighten.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
   1. All moldings must provide for a minimum 1/8 inch (3.18mm) of panel expansion at joints and edges, to insure proper installation.
   2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.03 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of interior paints, stains, varnishes, and other coatings.

1.02 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications: Shop-primed items.

B. Section 05 51 00 - Metal Stairs: Shop-primed items.

C. Division 23 - Mechanical Identification: Painted identification.

D. Division 26 - Electrical Identification: Painted identification.

1.03 REFERENCES

A. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.

B. SSPC (PM1) - Steel Structures Painting Manual, Vol. 1, Good Painting Practice; Society for Protective Coatings.

1.04 SUBMITTALS

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

B. Product Data: Provide data on all finishing products.

C. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 6 x 6 inches in size.

1.05 DELIVERY, STORAGE, AND PROTECTION

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 and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.07 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Supply 1 gallon of each color; store where directed.

C. Label each container with color in addition to the manufacturer's label.

'

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Paints:
   1. Base Manufacturer: Sherwin-Williams.
   2. Other Acceptable Manufacturers:
      a. Benjamin Moore & Co.
      b. Duron Paints.
      c. PPG Paints.
      d. Pratt & Lambert.

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

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
   1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
   2. For good flow and brushing properties.
   3. Capable of drying or curing free of streaks or sags.

B. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Chemical Content: The following compounds are prohibited:
   1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

2.03 PAINT SYSTEMS - EXTERIOR

A. Refer to Section :09 96 00 High Performance Coatings for exterior finishes field applied to metal substrates.

2.04 PAINT SYSTEMS - INTERIOR

A. Masonry, Opaque, Latex, 3 Coat:
   1. One coat of block filler; S-W PrepRite Block Filler, B25W25
   2. Semi-gloss: Two coats of latex enamel; S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W2600 Series.

B. Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer; S-W DTM Acrylic Primer/Finish B66W1
   2. Semi-gloss: Two coats of latex enamel; S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series.

C. Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with latex primer; S-W DTM Acrylic Primer/Finish B66W1
   2. Semi-gloss: Two coats of latex enamel; S-W DTM Acrylic Semi-Gloss Coating, B66-200 Series.

D. Masonry, Epoxy Enamel, 3 Coat (wet areas):
   1. One coat of catalyzed epoxy primer; Kem Cati-Coat HS Epoxy Filler/Sealer @ 10-20 mils as needed to fill voids and provide a continuous substrate.
   2. Gloss: Two coats of catalyzed epoxy enamel; Macropoxy 646 at 5-10 mils thick.
   3. Locations: Wet areas; car wash and detail bays.

D. Masonry, Epoxy Enamel, 3 Coat (dry areas):
   1. One coat of block filler; S-W Pro Industrial Heavy Duty Block Filler, B42W00150.
   2. Gloss: Two coats of catalyzed epoxy enamel; S-W Pro Industrial Water Based Catalyzed Epoxy Gloss; B73-300 Series.

E. Gypsum Board, Latex, 3 Coat:
   1. One coat of primer sealer; S-W ProMar 200 Zero VOC Latex Primer B28W2600.
   2. Eggshell: Two coats of latex enamel; S-W ProMar 200 Zero VOC Latex Eg-Shel B20—12600 Series.
   3. Flat: Two coats of latex enamel; S-W ProMar 400 Latex Flat B-30-4600 Series.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Concrete Unit Masonry: 12 percent.

3.02 PREPARATION

A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

C. Marks: Seal with shellac those which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Interior Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

F. Interior Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

G. Interior Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

H. Interior Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

I. Interior Shop-Primed Steel Surfaces to be Finish Painted: 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.

J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

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

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

D. Sand wood surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.04 CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically noted. Materials and products having factory applied primers are not considered factory finished.
   2. Fire rating labels, equipment serial number and capacity labels.
   3. Stainless steel items.
   4. Concealed pipes, ducts, and conduits.

B. Paint Surfaces described in PART 2, Paint Systems.

END OF SECTION

SECTION 09 96 00

HIGH PERFORMANCE COATING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Exterior high performance coatings applied in field.
   2. Surface preparation.

1.2 REFERENCES

B. American Society for Testing and Materials (ASTM):
   1. ASTM D523: Standard Test Method for Specular Gloss.

C. Steel Structures Painting Council (SSPC):
   1. SSPC SP 3-82: Surface Preparation Specification No. 3 - Power Tool Cleaning.
   2. SSPC SP-7-85: Surface Preparation Specification No. 7 - Brush Blast Cleaning.

1.3 DEFINITIONS

D. Paint : Paint/coating systems materials, including primers, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats, and of various degrees of opacity or sheen.

E. Dry Film Thickness (DFT): Specified by minimum thickness in mils, per coat, unless otherwise indicated.

1.4 PAINT/COATING SYSTEMS

F. Refer to schedule in this Section for paint/coating system descriptions.

1.5 SUBMITTALS

G. Comply with Section 00 13 00, unless otherwise indicated.

H. Materials and Products List: List of products in same order and same generic name as listed in this Section. List proposed manufacturer and manufacturer's product name and number. Identify deviations, if any.

I. Samples: If requested by Architect.

J. Color Samples: Submit 2 paper-backed samples, 3 by 5 inches, of each color and type of material indicated. Samples will be reviewed for sheen as well as for color.

K. Quality Control Submittals:
   1. Statement of qualifications.
   2. Design data.
   3. Test reports showing documented performance data as shown herein.
   4. Field Quality Control Submittals is specified in Part 3.
   5. Manufacturer's field reports.

L. Contract Closeout Submittals: Comply with Section 01 78 00.
   1. Project record documents.
   2. Maintenance manuals.

1.6 QUALITY ASSURANCE

M. Manufacturer's Qualifications: Not less than 5 years experience in the actual production of specified products.

N. Applicator's Qualifications: Firm experienced in application or installation of systems similar in complexity to those required for this Project.

O. Regulatory Requirements: Paint systems to comply with VOC regulations applicable.

P. Product Identification: Provide manufacturer's product identification on product containers same as that on final product list. In addition, provide color identification, analysis of contents, instructions for application and for reducing(if applicable) on containers.

Q. Pre-installation Conference: Contractor, installer, manufacturer's representative, and representatives of other affected trades shall meet at Site to review procedure, acceptance of substrate surfaces, and coordination with other trades.

R. Single Source Responsibility for Steel Receiving a Finish Coat: Manufacturer selected for shop preparation and priming must provide finish coat. No exceptions.

1.7 DELIVERY, STORAGE, AND HANDLING

S. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's product identification.

T. Storage and Protection: Comply with manufacturer's recommendations.
   1. Remove oily rags, waste, etc., every night and take every precaution to prevent fire.
   2. Store in a cool, dry place out of direct sunlight.
   3. Protect from the elements and from damage.
   4. Store at a temperature of not less than 40 degrees F.

1.8 PROJECT CONDITIONS

U. Environmental Requirements: Maintain ambient temperature above 40 degrees F. during and 24 hours after installation.

V. Environmental Requirements: Apply water-borne coatings when the temperature of surfaces to be coated and surrounding air temperature is between 50 degrees F. and 90 degrees F. Apply solvent-thinned coatings only when the temperature of surfaces to be coated and the surrounding air temperature is between 45 degrees F. and 95 degrees F. Do not apply coatings in precipitation, fog or mist, when the relative humidity exceeds 85 percent, or at temperatures less than 5 degrees F. above the dew point, or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Tnemec Company, Inc. (Tnemec)
   2. Comparable products of the following manufacturers:
      a. Sherwin Williams
      b. Carboline Company.
      c. PPG Industries Inc.

B. Drawings and specifications are based on manufacturer's proprietary literature from Tnemec. Other manufacturers shall comply with the minimum levels of material performance specified herein.

2.2 PRIMERS

C. **Steel (Exterior):**
1. Aromatic Urethane Zinc-Rich
2. Performance Requirements:
   a. Adhesion: ASTM D3359 (Method B, 5mm Crosshatch); No less than a rating of 5.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after or 1,000 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No rust creepage at scribe after 4,000 hours exposure.
   d. Exterior Exposure: Saltwater, splash and spray. No blistering, cracking, rusting or delamination of film after one year exposure.
   e. Static Fatigue: Tests conducted in conformance with AISC specifications using equipment as described in the Research Council on Structural Connections Specifications, Appendix A, Section 4.1. Meets requirements of a Class B surface with a mean slip coefficient no less than 0.50 and a tension creep not in excess of .005 inch (.13mm).

D. **Galvanized Steel (Exterior):**
1. Polyamide Epoxy
2. Performance Requirements:
   a. Adhesion: ASTM D3359 (Method B, 5mm Crosshatch); No less than a rating of 5.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 4,500 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe after 1,500 hours exposure.
   d. Exterior Exposure: Exposed at 45 degrees facing ocean. No blistering, cracking or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe and no more than two percent rusting at edgers after 36 months exposure.
   e. Abrasion: ASTM D 4060, (CS-17 Wheel, 1,000 grams load.) No more than 115 mg loss after 1,000 cycles.
   f. Fresh Water: Contimous immersion in tap water at 75 degrees F. No blistering, cracking rusting or delamination of film after four years.
   g. Hardness: ASTM D 3363 (pencil). Must pass 3H (Gouge).

E. **Steel Bollards (Exterior):**
1. Aromatic Polyurethane, Penetrating Primer
2. Performance Requirements:
   a. Adhesion: ASTM D3359 (Method B, 5mm Crosshatch); No less than a rating of 5.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film. No rust creepage at scribe after or 1,500 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No rust creepage at scribe after 1,500 hours exposure.
   d. Exterior Exposure: Exposed at 45 degrees facing south. No blistering, cracking or delamination of film after 4 years.
   e. Abrasion: ASTM D 4060, (CS-17 Wheel, 1,000 grams load.) No more than 77 mg loss after 1,000 cycles.

2.3 INTERMEDIATE COATS

A. **Steel (Exterior):**
1. Polyamide Epoxy
2. Performance Requirements:
   a. Adhesion: ASTM D3359 (Method B, 5mm Crosshatch); No less than a rating of 5.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 4,500 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe after 1,500 hours exposure.
   d. Exterior Exposure: Exposed at 45 degrees facing ocean. No blistering, cracking or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe and no more than two percent rusting at edges after 36 months exposure.
   e. Abrasion: ASTM D 4060, (CS-17 Wheel, 1,000 grams load.) No more than 115 mg loss after 1,000 cycles.
   f. Fresh Water: Continuous immersion in tap water at 75 degrees F. No blistering, cracking rusting or delamination of film after four years.
   g. Hardness: ASTM D 3363 (pencil). Must pass 3H (Gouge).

B. **Steel Bollards (Exterior):**
1. Polyamide Epoxy
2. Performance Requirements:
   a. Adhesion: ASTM D3359 (Method B, 5mm Crosshatch); No less than a rating of 5.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 4,500 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe after 1,500 hours exposure.
   d. Exterior Exposure: Exposed at 45 degrees facing ocean. No blistering, cracking or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe and no more than two percent rusting at edges after 36 months exposure.
   e. Abrasion: ASTM D 4060, (CS-17 Wheel, 1,000 grams load.) No more than 115 mg loss after 1,000 cycles.
   f. Fresh Water: Continuous immersion in tap water at 75 degrees F. No blistering, cracking rusting or delamination of film after four years.
   g. Hardness: ASTM D 3363 (pencil). Must pass 3H (Gouge).

2.4 FINISH COATS

A. **Steel (Exterior):**
1. Aliphatic Acrylic Polyurethane
2. Performance Requirements:
   a. Adhesion: ASTM D4541; No less than a 1000 psi (6.89 MPa) pull.
   b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 3,000 hours exposure.
   c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/16" rust creepage at scribe after 2,000 hours exposure.
   d. QUV Exposure: ASTM G53 (UVA –340 bulbs, 4 hours light, 4 hours dark). No blistering, cracking or chalking. Less than 52% gloss loss and 1.8 DED FMCII (MacAdam units) color change after 2000 exposure.
   e. Abrasion: ASTM D4060 (CS-17 Wheel, 1000 grams load). No more than 139 mg loss after 1,000 cycles.
   f. Flexibility: ASTM D 522 (Method A Conical Mandrel). No less than 19.3% elongation.
   g. Hardness: ASTM D3363. No gouging or scratching with an HB or less pencil.
   h. Impact: ASTM B2794. No visible cracking or delamination of film after 48 inch-pounds or less direct impact.
   i. Prohesion: ASTM G 85 (Annex A5). No blistering, cracking, rusting or delamination of film. No more than 1/32" (0.8 mm) rust creepage at scribe after 2000 hours exposure.

B. **Galvanized Steel (Exterior):**
   1. Aliphatic Acrylic Polyurethane
   2. Performance Requirements:
      a. Adhesion: ASTM D4541; No less than a 1000 psi (6.89 MPa) pull.
      b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 3,000 hours exposure.
      c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/16" rust creepage at scribe after 2,000 hours exposure.
      d. QUV Exposure: ASTM G53 (UVA –340 bulbs, 4 hours light, 4 hours dark). No blistering, cracking or chalking. Less than 52% gloss loss and 1.8 DED FMCII (MacAdam units) color change after 2000 exposure.
      e. Abrasion: ASTM D4060 (CS-17 Wheel, 1000 grams load). No more than 139 mg loss after 1,000 cycles.
      f. Flexibility: ASTM D 522 (Method A Conical Mandrel). No less than 19.3% elongation.
      g. Hardness: ASTM D3363. No gouging or scratching with an HB or less pencil.
      h. Impact: ASTM B2794. No visible cracking or delamination of film after 48 inch-pounds or less direct impact.
      i. Prohesion: ASTM G 85 (Annex A5). No blistering, cracking, rusting or delamination of film. No more than 1/32" (0.8 mm) rust creepage at scribe after 2000 hours exposure.

C. **Steel Bollards (Exterior):**
   1. Aliphatic Acrylic Polyurethane
   2. Performance Requirements:
      a. Adhesion: ASTM D4541; No less than a 1000 psi (6.89 MPa) pull.
      b. Humidity: ASTM D4585: No cracking, blistering, rusting or delamination of film after 3,000 hours exposure.
      c. Salt Spray (Fog): ASTM B117; No blistering, cracking, rusting or delamination of film. No more than 1/16" rust creepage at scribe after 2,000 hours exposure.
      d. QUV Exposure: ASTM G53 (UVA –340 bulbs, 4 hours light, 4 hours dark). No blistering, cracking or chalking. Less than 52% gloss loss and 1.8 DED FMCII (MacAdam units) color change after 2000 exposure.
      e. Abrasion: ASTM D4060 (CS-17 Wheel, 1000 grams load). No more than 139 mg loss after 1,000 cycles.
      f. Flexibility: ASTM D 522 (Method A Conical Mandrel). No less than 19.3% elongation.
      g. Hardness: ASTM D3363. No gouging or scratching with an HB or less pencil.
      h. Impact: ASTM B2794. No visible cracking or delamination of film after 48 inch-pounds or less direct impact.
      i. Prohesion: ASTM G 85 (Annex A5). No blistering, cracking, rusting or delamination of film. No more than 1/32" (0.8 mm) rust creepage at scribe after 2000 hours exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Protect surfaces not being coated concurrently, or not to be coated, and the finished Work of other trades.
   1. Remove device plates, escutcheons, and similar removable items before coating and reinstall items after final coat of system has dried.
   2. Apply masking tape over UL labels and hardware items that cannot be removed, before coating the surface on which they occur.
   3. Remove protective coverings and masking tape when coating of surfaces or items is completed.

3.3 PREPARATION OF NEW SURFACES

A. Mildew Removal: Scrub with approved cleaning/bleaching solution, then rinse with potable water; let thoroughly dry.

B. Steel and Iron: Put in proper condition to receive coating system. Use only prime coats compatible with finish coats.

C. Shop-primed surfaces: Power tool clean to bare metal (SSPC-SP11).

D. Surfaces not previously shop-primed: Commercial blast cleaning (SSPC-SP6) or power tool clean to bare metal (SSPC-SP11).

E. Galvanized Steel: Remove surface contamination, Brush blast or Oakite 747LTS.

3.4 APPLICATION

A. Apply at rates recommended by manufacturer. Do not exceed application rate recommended for the surface involved. Use materials without adulteration and only with thinning agents recommended by the manufacturer in the printed instructions.

B. Apply materials with suitable brushes, rollers, or spraying equipment. Keep brushes, rollers and spraying equipment, clean, free from contaminants and suitable for the finish required.

C. Vary slightly the color of successive coats under the finish coat.

D. Comply with the recommendation of the material manufacturer for drying time between succeeding coats.

E. Sand and dust between each coat to remove defects visible from a distance of 5 feet.

F. Apply finish coats smooth, free of brush marks, streaks, laps, pile-up of paint, runs, sags, holidays, air bubbles, and excessive roller stipple. Apply additional finish coats to entire surface if undercoats show through and to correct any defect.

G. Make edges of coatings adjoining other materials or colors clean and sharp with no overlapping.

3.5 CLEANING

A. Touch up and restore finishes where damaged. Remove spilled, splashed, or splattered coatings from all surfaces without damaging them.

3.6 PROTECTION

A. Protect the Work, whether to be coated or not, against damage by painting. Provide means to protect newly coated finishes. Remove masking tape and other protection media and its residue after coating.

3.7 COATING SCHEDULE

A. Coat the following substrates as follows and where indicated in the Drawings**.**

1. **Steel (Exterior)**
   Primer: (Aromatic Urethane, Zinc-Rich) Tnemec Series 90-97.
   Intermediate: (Polyamide Epoxy) Tnemec Series 66.
   Finish: (Aliphatic Acrylic Polyurethane) Tnemec Series 1075.
   Or
   Primer: SW Corothane I Galvapac; B65G10.
   Intermediate: SW MacroPoxy 646; B58-600.
   Finish: SW Acrolon 218 HS; B65 Series.

2. **Galvanized Steel (Exterior)**.
   Primer: (Polyamide Epoxy) Tnemec Series 66.
   Finish: (Aliphatic Acrylic Polyurethane) Tnemec Series 1075
   Or
   Primer: SW MacroPoxy 646; B58-600.
   Finish: SW Acrolon 218 HS; B65 series.

3. **Steel Bollards (Exterior)**.
   Primer: (Moisture-Cured Aromatic Urethane) Tnemec Series 530
   Intermediate: (Polyamide Epoxy) Tnemec Series 66.
   Finish: (Aliphatic Acrylic Polyurethane) Tnemec Series 1075.
   Or
   Primer: SW Corothane I Mio Aluminum; B65S14.
   Intermediate: SW MacroPoxy 646; B58-600.
   Finish: SW Acrolon 218 HS, B65 Series.

3.8 COLOR SCHEDULE

Re: Finish Schedule on Drawings for colors.

END OF SECTION

SECTION 09 97 23

EXTERIOR CONCRETE COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide textured acrylic-based primer and finish coating for vertical, above-grade, new uncoated concrete curbs at building perimeter.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Material Safety Data Sheets.

1.03 REFERENCES

A. ASTM D 412, Tensile Strength, Elongation, and Recovery
B. ASTM D 522, Mandrel Bend Flexibility
C. ASTM D 2247, Moisture Resistance
D. ASTM D 3273, Mold Resistance
E. ASTM D 4541, Direct Tensile Bond
F. ASTM E 96, Water Vapor Permeability, wet cup method
G. EPA Method 24, VOC
H. EN 1062, Carbon Dioxide Diffusion

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The manufacturer shall be a company with at least twenty years experience and regularly engaged in the manufacture and marketing of products specified herein. The manufacturer shall have an ISO 9001-2000 certified quality system.

B. Installer's Qualifications: The contractor shall be qualified to perform the work specified by reason of experience.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.

B. Store products in a dry area with temperature maintained between 50 and 85 degrees F (10 and 29 degrees C). Protect from direct sunlight. Protect from freezing.

C. Handle products in accordance with manufacturer's printed recommendations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. **Concrete substrate** primer: Acrylic-based, tinted, high-pH compatible primer/sealer:

1. 805 Sto Hot Prime, as manufactured by Sto Corp., 3800 Camp Creek Parkway, Building 1400, Suite 120, Atlanta, Georgia 30331.
   a. Substitutions: None permitted.
2. Performance and Physical Properties: Meet or exceed the following values for material cured at 73 degrees F (23 degrees C) and 50 percent relative humidity (unless otherwise specified).
   a. Application: Spray, roller, or brush.
   b. Working time: 10-20 minutes, depending on ambient conditions.
   c. Adhesion to concrete: 680 psi (4.69 MPa), ASTM D 4541
   d. Flame Spread Index: 0, ASTM E 84
   e. Smoke Developed: 10, ASTM E 84
   f. Water vapor transmission: 30 perms (1720 ng/Pa·s·m^2), tested at 3 dry mils applied in one coat, ASTM E 96, wet cup method.
   g. VOC: < 0.84 lb/gal (100 g/L), EPA 24

B. Textured, acrylic-based, textured, weatherproofing colored coating: Single component acrylic-based coating, containing acrylic polymer, texturing aggregate and colored pigments. Product shall comply with the following:

1. 657 StoCoat Acryl Medium, as manufactured by Sto Corp.
   a. Substitutions: None permitted.
2. Performance and Physical Properties: Meet or exceed the following values for material cured at 73 degrees F (23 degrees C) and 50 percent relative humidity (unless otherwise specified).
   a. Application: Spray, or roller.
   b. Working Time: 10-30 minutes.
   c. Moisture Resistance: No defects attributable to adhesion, discoloration, blistering, cracking, flaking, ASTM D 2247, 14 day exposure.
   d. Water Vapor Permeability: 21 perms (1200 ng/Pa·s·m^2) tested at 5 mils applied in one coat, and 13 perms (750 ng/Pa·s·m^2) tested at 9 mils applied in two coats, ASTM E 96, wet cup method.
   e. Flexibility Mandrel Bend: No cracking at -14 degrees F (-26 degrees C), ASTM D 522.
   f. Mold Resistance: No Mold Growth at 90 days, ASTM D 3273
   g. Adhesion to Concrete: 300 psi (2.07 MPa), ASTM D 4541
   h. Carbon Dioxide Diffusion Resistance Coefficient: 317,000, EN 1062
   i. Carbon Dioxide Diffusion Resistance: 140 m, EN 1062
   j. VOC: 0.9 lb/gal (102 g/L), EPA 24

PART 3 - EXECUTION

3.01 INSTALLATION OF PRIMER AND COATING

A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas and landscaping from contact due to mixing and handling of materials.

C. Surface Preparation: Comply with manufacturer's printed instructions and the following.

1. Clean surfaces of bond-inhibiting materials including oil, mildew, dust, and dirt.
2. Surface must be dry at time of application.
3. **Concrete:** surfaces to receive 805 Sto Hot Prime shall be properly cured and at least 7 days old.

D. Mixing: Comply with manufacturer's printed instructions and the following.

1. Precondition to temperature of 70 plus or minus 5 degrees F (21 plus or minus 2.5 degrees C) prior to application.
2. Mix using a mechanical mixer to achieve a uniform consistency immediately prior to use.

E. Application: Comply with manufacturer's printed instructions and the following.

1. Apply when ambient and surface temperatures are 40 degrees F (4 degrees C) and rising.
2. Do not apply in freezing conditions or during precipitation.
3. Do not apply if the surface temperature is less than 5 degrees F (2.8 degrees C) above the ambient dew point temperature.
4. **Concrete** substrates: Apply 805 Sto Hot Prime in one coat by brush, roller, or spray to a thickness of 5 wet mils.
5. Allow primer to dry completely before applying finish coating.
6. Select one of the options below, depending on type construction, weather exposure and required level of performance:
   a. **Decorative and Protective** finish coating (one coat application): Apply one coat, 8 - 10 wet mils, 657 StoCoat Acryl Medium to primed surface.
7. Protect installed materials from rain, freezing, and continuous high humidity until completely dry.
8. Do not overcoat with solvent-based materials.

END OF SECTION

SECTION 10 21 13
PHENOLIC CORE TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Phenolic core compartment partitions for the following applications:
      a. Toilet enclosures.
      b. Urinal screens.

B. Related Requirements:
   1. Division 03 Section "Cast in Place Concrete" for compartment anchorage to concrete substrates.
   2. Division 06 Section "Rough Carpentry" for compartment anchorage to frame walls.

1.2 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A 240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   2. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   3. ASTM B 86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.
   4. ASTM B 221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   5. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
   6. ASTM D6578 / D6578M - Standard Practice for Determination of Graffiti Resistance
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. International Code Council (ICC)/American National Standards Institute (ANSI):
   1. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities, as applicable to toilet compartments designated as accessible.

C. United States Department of Justice:
   1. ADA - Americans with Disabilities Act, Excerpt from 28 CFR Part 36 - ADA Standards for Accessible Design.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for each type of product indicated. Include fabrication details, description of materials and finishes.
   1. Product Test Reports: When requested by Architect, submit documentation by qualified independent testing agency indicating compliance of products with requirements.

B. Shop Drawings: Include overall product dimensions, floor plan, elevations, sections, details, and attachments to other work. Include choice of options with details.

C. Samples for Verification: Furnish physical sample of material in selected color.
   1. Size: 2 by 2 inches (52 by 52 mm) minimum, in type of finish specified.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance and cleaning instructions.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum five years' experience in the manufacture of toilet compartments.

B. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum five years' experience in the manufacture of toilet compartments. Manufacturers seeking approval must submit the following in accordance with Instructions to Bidders and Division 01 requirements:
   1. Design and Aesthetic Compliance: Product design features that mimic BOD design aesthetic.
   2. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
   3. Samples of each component of product specified.
   4. List of successful installations of similar products available for evaluation by Architect.

C. Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum three years.

D. Source Limitations: Obtain toilet compartment components and accessories from single manufacturer.

E. Accessibility Requirements: Comply with requirements of ICC/ANSI 117.1, and with requirements of authorities having jurisdiction.

F. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Class B - Flame-spread, smoke developed.
   2. Flame-Spread Index: 26-75.
   3. Smoke-Developed Index: 0-450.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation.
   1. Deliver toilet compartments in manufacturer's original packaging.
   2. Store in an upright condition.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:
   1. Phenolic LT Toilet Partitions: Against delamination: 5 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of **Bradley Corporation, Menomonee Falls, WI 53051**.
   1. Contact Information: (800)272-3539, fax (262)251-5817; Email info@BradleyCorp.com; Website: www.bradleycorp.com.

2.2 DESIGN

A. Modern minimalist design with flush surface construction and continuous headrail "cap" at top of door, panel and pilaster.
   1. Standard height of 81.9 inches (2080 mm) including the 3.9 inches (99 mm) floor clearance.
   2. Panels shall be Phenolic face sheets laminated to a cardboard hexagonal honeycomb core, and edge banded with extruded aluminum profiles.

2.3 MATERIALS

A. Panel Face Sheets: 3 mm decorative Phenolic sheets.
   1. Phenolic materials shall be impact and scratch resistant. Anti-bacterial coating and non-porous surface to reduce spread of germs.
   2. Impact Resistant: ASTM D2794.
   3. Scratch Resistant: ASTM D6578.

B. Panel Core: face sheets laminated to a treated cardboard hexagonal honeycomb core, and edge banded with extruded aluminum profiles.

C. Stainless Steel Sheet: ASTM A 240 or A 666, 300 series.

D. Stainless Steel Castings: ASTM A 743/A 743M.

E. Aluminum: ASTM B 221.

2.4 PHENOLIC CORE TOILET COMPARTMENTS

A. Toilet Compartment Type:
   1. Overhead braced.
      a. Basis of Design Product: **Bradley Corporation, Euro Style, Series LOFT**.

B. Urinal Screen Style:
   1. Wall hung/ floor supported:
      a. Basis of Design Product: **Bradley Corporation, Euro Style, Series LOFT**.

2.5 CONSTRUCTION

A. Door, Panel, and Pilaster Construction, General:
   1. Provide Phenolic face sheets free of pitting, visible seams and fabrication marks, stains, telegraphing of core material, or other imperfections. Aluminum edge banding.

B. Door Construction: 1.4 inches (36 mm) thick.
   1. Rebated aluminum profile at lock side of door and pilaster with aluminum edge banding.

C. Panel Construction: 1.4 inches (36 mm) thick.
   1. Provide panel with floor feet with mechanical adjustment for leveling.

D. Pilaster Construction: 1.4 inches (36 mm) thick.
   1. Adjustable floor feet shall maintain panels 9 inches (229 mm) above finished floor.

E. Headrail: 1.2 inches (30 mm) x 1.2 inches (30 mm) extruded anodized aluminum channel headrail profile. Continuous flush across top of the pilaster, panel and door. Provide stainless steel brackets to secure to wall.

F. Feet: Constructed of stainless steel.

G. Brackets (Fittings): Continuous Aluminum “U” brackets at wall and panel to panel connection.

H. Urinal-Screen Construction: Matching toilet compartment panel construction.
   1. Urinal-Screen Feet: Manufacturer's standard floor feet design with panel matching the pilaster and secured to wall with continuous bracket.

2.6 FINISH

A. Provide panels, pilasters and doors with the following color(s)
   1. As indicated in Drawings.

2.7 HARDWARE

A. Hardware: Manufacturer's standard stainless steel castings, including corrosion-resistant, tamper-resistant fasteners:
   1. Hinges: Self-closing doors with two aluminum gravity hinges for a maximum door opening of 110 degree slow-close hinge with finger protection (in-swing doors only). The 110 degree self-closing hinge is hidden in the structure of the door. Out-swing doors are equipped with 180 degree gravity slow-close exposed barrel hinge (not finger protection).
   2. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall.
   3. Door Latch: Stainless steel door knob. Inside door knob has an easy-to-maneuver paddle built into the locking wheel. White/red indication latch and emergency release feature is integrated on the outside of the door knob. The emergency release uses a 5/32 inch (4 mm) Allen key that is inserted into the center of the door knob from the outside to unlock the door.
   4. Door Pull: Stainless steel, thru-bolt (each side) on ambulatory and accessible compartment doors and where scheduled or indicated.

2.8 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions.

B. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant feet anchoring assemblies with leveling adjustment at bottoms of panel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.
   1. Proceed with installation once conditions meet manufacturer's requirements.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Install toilet partitions and screens in spaces with operating, temperature controlled HVAC systems. Shield partitions and screens from direct sunlight.

C. Brackets: Secure panels to walls with continuous brackets. Locate bracket so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 15 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

3.4 FINAL CLEANING

A. Remove packaging and construction debris and legally dispose of off-site.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 10 22 39
FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Top-supported folding panel partitions, horizontal opening.

B. Ceiling track and operating hardware.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking and track support shimming.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] 2013.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.

D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009.

E. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation Between Spaces Separated by Operable Partitions 2012 (Reapproved 2020).

F. ASTM E596 - Standard Test Method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures 1996 (Reapproved 2009).

G. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics 2020.

1.04 SUBMITTALS

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

B. Product Data: Provide data on partition materials, operation, hardware and accessories, and colors and finishes available.

C. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, adjacent construction and finish trim, and stacking depth.

D. Samples for Review: Submit two samples of surface finish, 12 by 12 inches size, illustrating quality, colors selected, texture, and weight.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified this section with minimum five years ofdocumented experience.

B. Installer Qualifications: Company specializing in performing work of this section with minimum five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until installation.

1.07 WARRANTY

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

B. Correct defective Work within five year period after Date of Substantial Completion.

C. Provide two year manufacturer warranty against defects in material and workmanship, excluding abuse.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Folding Panel Partitions - Horizontal Opening:
   1. Hufcor, Inc; Series 600: www.hufcor.com.
   2. Modernfold, a DORMA Group Company: www.modernfold.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FOLDING PANEL PARTITIONS - HORIZONTAL OPENING

A. Folding Panel Partitions: Side opening; individual panels; side stacking; manually operated.

B. Panel Construction:
   1. Frame: 16 gage, 0.0598 inch thick formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, with acoustical insulation fill.
   2. Substrate: Gypsum board.
   3. Panel Substrate Facing: Steel sheet, manufacturer's standard thickness.
   4. Panel Properties:
      a. Thickness With Finish: 4 inches.
      b. Width: Standard width.
      c. Weight: 8 lb/sq ft.

C. Panel Finishes:
   1. Facing: Vinyl coated fabric.

D. Panel Seals:
   1. Panel to Panel Seals: Grooved and gasketed astragals, with continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.
   2. Acoustic Seals: Flexible acoustic seals at jambs, meeting mullions, ceilings, retractable floor and ceiling seals, and above track to structure acoustic seal.

E. Suspension System:
   1. Track: Formed steel; 1-1/4 by 1-1/4 inch size; thickness and profile designed to support loads, steel sub-channel and track connectors, and track switches.
   2. Carriers: Nylon wheels on trolley carrier at top of every second panel, sized to carry imposed loads, with threaded pendant bolt for vertical adjustment.

F. Performance:
   1. Acoustic Performance:
      a. Sound Transmission Class (STC): 53 to 57 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft.
   2. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.

G. Accessories:
   1. Ceiling Closure: White enameled ceiling closure; aluminum jamb and head molding, fittings and attachments, and intermediate meeting posts.

2.03 MATERIALS

A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Vinyl Coated Fabric: ASTM F793 Category VI, polyvinyl fluoride (PVC) finish for washability and improved flame retardance; color as selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as required by the manufacturer.

3.02 INSTALLATION

A. Install partition in accordance with manufacturer's instructions and ASTM E557.

B. Install acoustic sealant to achieve required acoustic performance.

C. Coordinate electrical connections.

3.03 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

A. Clean finish surfaces and partition accessories.

3.05 CLOSEOUT ACTIVITIES

A. Demonstrate operation of partition and identify potential operational problems.

END OF SECTION

SECTION 10 28 00

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms and utility rooms.

B. Grab bars.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates.

B. Section 10 21 13.23 - Solid Phenolic Toilet Compartments.

1.03 REFERENCE STANDARDS

A. ASTM A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM C 1036 - Standard Specification for Flat Glass.

E. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

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

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products listed are made by Bobrick Washroom Equipment, Inc.

B. Other Acceptable Manufacturers:
   1. A & J Washroom Accessories Inc: www.ajwashroom.com.
   2. American Specialties, Inc: www.americanspecialties.com.
   3. Bradley Corporation: www.bradleycorp.com.

C. Substitutions: Section 01 60 00 - Product Requirements.

D. All items of each type to be made by the same manufacturer.

2.02 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.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Stainless Steel Sheet: ASTM A 666, Type 304.

C. Stainless Steel Tubing: ASTM A 269, Type 304 or 316.

D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M, with G90/Z275 coating.

E. Mirror Glass: Float glass, ASTM C 1036 Type I, Class 1, Quality Q2, with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with GSA CID A-A-3002.

F. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06 10 00 for installation of blocking, reinforcing plates, and concealed anchors in walls.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 SCHEDULE (See Drawings)

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc..

1.04 SUBMITTALS

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

B. Shop Drawings: Indicate cabinet physical dimensions.

C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.05 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguisher Cabinets and Accessories:
   1. JL Industries, Inc; www.jlindustries.com.
   2. Larsen's Manufacturing Co: www.larsensmfg.com.
      Product: Architectural Series SS2409-R2 (Basis of Design)
   3. Potter-Roemer: www.potterroemer.com.

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

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

B. Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
   1. Class: A:B:C.
   2. Size: 10 pound.
   3. Finish: Baked polyester powder coat, color as selected.

2.03 FIRE EXTINGUISHER CABINETS

A. Cabinet Metal: Formed primed steel sheet; 0.036 inch thick base metal.

B. Cabinet Configuration: Recessed type.
   1. Trim: 5/16 inch projection, 2-1/2 inch wide face.

C. Door: 304 stainless steel, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with two butt hinge. Provide nylon catch.

D. Door Glazing: Glass, clear, 1/8 inch thick tempered. Set in resilient channel gasket glazing.

E. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

F. Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: Stainless Steel #4 finish.

H. Finish of Cabinet Interior: White baked enamel.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 48 inches from finished floor to the centerline of the cabinet handle, unless otherwise indicated.

C. Secure rigidly in place.

D. Place extinguishers in cabinets and on wall brackets.

END OF SECTION

SECTION 12 24 00
MANUAL ROLLER SHADES

PART 1 GENERAL

2.01 SECTION INCLUDES

A. Manually operated window roller shades and accessories.

B. Shade fabric.

2.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

B. Section 09 21 16 - Gypsum Board Assemblies: Substrate for window shade systems.

C. Section 09 51 00 - Acoustical Ceilings: Shade Pockets, pocket closures and accessories.

2.03 REFERENCE STANDARDS

A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments 2002a (Reapproved 2010).

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2015.

2.04 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

1. Do not fabricate shades until field dimensions for each opening have been taken.

2. Do not install shades until final surface finishes and painting are complete.

2.05 SUBMITTALS

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

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Selection Samples: Include fabric samples in full range of available colors and patterns.

D. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

2.06 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 this type with minimum five years ofdocumented experience.

2.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

2.08 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

2.09 WARRANTY

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

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:

1. Roller Shade Hardware and Chain: Manufacturer's standard non-depreciating tweny-five year limited warranty.
2. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.
3. Roller Shade Installation: One year from date of Substantial Completion.

PART 2 PRODUCTS

3.01 MANUFACTURERS

A. Manually Operated Roller Shades:

1. Mecho, Inc.; Mecho/5 Manual Shade System: www.mechoshade.com.
2. Substitutions: See Section 01 60 00 - Product Requirements.

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

3.02 WINDOW SHADE APPLICATIONS

A. Interior Roller Shades: Sheer shades.

1. Type: Roll down, closed position is at window sill.
2. Fabric: As indicated in Drawings..
3. Color: As indicated in Drawings.
4. Mounting: Inside (between jambs).
5. Operation: Manual.

3.03 ROLLER SHADES

A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.

B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.

1. Sheer Shades: Reduce glare yet still reveal considerable details to the outside; no privacy; Openness Factor greater than 1 percent.
    a. Refer to Drawings.
2. Flammability: Pass NFPA 701 large and small tests.

C. Roller Tubes: As required for type of operation.

1. Material: Extruded aluminum or galvanized steel; as required for shade location.
2. Size: Manufacturer's standard, selected for suitability for installation conditions, span, and weight of shades.

D. Hembars: Designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.

1. Style: Thermally sealed fabric pocket covering rectangular aluminum hembar.

E. Manual Operation for Interior Shades: Clutch operated continuous loop; beaded ball chain.

3.04 ACCESSORIES

A. Fascias: Size as required to conceal shade mounting.

1. Style: As selected by Architect from shade manufacturer’s full selection.

B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.

C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

3.05 FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Fabricate shades to fit openings within specified tolerances.

1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.

PART 3 EXECUTION

4.01 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

4.02 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

4.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Installation Tolerances:

1. Maximum Offset From Level: 1/16 inch.

C. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

4.04 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

4.05 CLOSEOUT ACTIVITIES

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

B. Training: Train Owner's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

4.06 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

4.07 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

A. END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plastic Laminate Countertops for architectural cabinetwork.

B. Wall-hung counters.

1.02 RELATED REQUIREMENTS

A. Section 06 41 00 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use.

B. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. AWI/AWMAC (QSI) - Quality Standard Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada.

E. NEMA LD 3 - High-Pressure Decorative Laminates.

F. PS 1 - Structural Plywood.

1.04 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. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 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.

1.06 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

2.01 COUNTERTOP ASSEMBLIES

A. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.
   1. Laminate Sheet, Unless Otherwise Indicated: NEMA LD 3 Grade HGS, 0.048 inch nominal thickness.
      a. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E 84.
      b. Surface Color and Pattern: As scheduled.
      c. Manufacturers:
         1) Formica Corporation: www.formica.com.
         2) Lamin-Art, Inc: www.laminart.com.
         3) Panolam Industries International, Inc\Nevamar: www.nevamar.com.
         4) Panolam Industries International, Inc\Pionite: www.pionitelaminates.com.
         5) Wilsonart International, Inc: www.wilsonart.com.
         6) Substitutions: See Section 01 60 00 - Product Requirements.
   2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
   3. Back and End Splashes: Same material, same construction.
   4. Fabricate in accordance with AWI/AWMAC Quality Standards Illustrated Custom Grade.

2.02 ACCESSORY MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.

B. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.

C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

D. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.03 FABRICATION

A. Fabricate in accordance with standards governing fabrication quality that are specified in Section 06 41 00.

B. 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 except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

C. 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, unless otherwise indicated.

E. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings or required, finished to match unless otherwise indicated.

PART 3 EXECUTION

3.01 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.

3.02 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.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

D. Seal joint between back/end splashes and vertical surfaces.

3.04 CLEANING

A. Clean countertops surfaces thoroughly.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 32 8470

UNDERGROUND IRRIGATION

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Scope of work: Furnish and install the complete underground irrigation system specified herein from point-of-connection throughout site; including labor, materials, equipment, apparatus, and services for the testing, adjusting, retesting and readjusting as required to place the system in an approved operating condition. The irrigation system shall include the design and installation of the following:
1. Piping
2. Meter and backflow assembly
3. Sprinkler heads
4. Valves and valve boxes
5. Controllers
6. Control wiring
7. Fittings
8. Electrical connections
9. Quick-couplers
10. All other necessary accessories
11. System Manuals
12. Instructional walk-through with Owner

B. Limits of work: All lawn areas within property line shall receive irrigation from spray or rotary heads, all landscape beds shall receive drip irrigation

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 329300 – Exterior Plants
2. Section 329223 – Turf & Grasses

1.03 QUALITY ASSURANCE

A. Irrigation contractor must have technical qualifications, experience, trained personnel and facilities to perform the specified work and have been engaged in sprinkler design and installation, of systems of similar size and scope, for at least five (5) years. Irrigation Contractor shall have completed a project of similar size and scope within the past three (3) years.

B. Shall be a Certified Irrigation Contractor as defined and regulated by the Irrigation Association.

B. Quality Control Criteria:
1. Provide irrigation products as described in this specification and according to manufacturer's specifications.
2. Comply with requirements of for prevention of backflow and backsiphonage.
3. Comply with requirements for plumbing and other regulations affecting site irrigation.
4. Comply with National Plumbing Code, National Electric Code, and applicable city or state codes.

1.04 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Submit manufacturer's literature, technical data, and recommendations for the system as specified including:
1. Pipe
2. Fittings
3. Sprinkler heads
4. Valves
5. Controller
6. Backflow preventer
7. Wiring
8. Valve boxes

C. Shop Drawings:
1. Design and submit an irrigation layout plan based on the Irrigation Identification Plan. The plan shall include the following information:
   a. Point-of-connection to existing services.
   b. Main and lateral pipe routing, size and sleeve locations and size under pavement.
   c. Sprinkler head layout, size, radius, and sprinkler head coverage.
   d. Zone Labels indicating valve sizes, GPM and locations.
   e. Component, control system and wiring diagram showing routes and sizes.
   f. Location and mounting details of controller.
   g. Irrigation details.
   h. Friction loss calculations for each zone.
2. Submit four (4) hardline sets of shop drawings and an electronic copy (AutoCAD release 20016 or newer).
3. Do not begin construction work until shop drawings have been approved.

D. Closeout Submittals – Submit the following:
1. As-built drawings: Following construction of system, submit two (2) reproducible hardline sets of as-built drawings and an electronic copy (AutoCAD release 20016 or newer).

E. Submit color-coded print of controller chart.

1.05 JOB CONDITIONS

A. Contractor shall carefully examine the work site, local conditions, specifications and plot plan for any existing conditions and limitations that may apply to the work. Submission of a proposal shall be considered evidence than an examination has been conducted.

B. Utilities: Determine location of utilities and perform work in a manner which will avoid possible damage. When necessary the Contractor shall make any minor adjustments in location or alignment of the new work. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned. Contact Architect if potential conflicts are apparent.

1.06 SEQUENCING AND SCHEDULING

A. Schedule and coordinate to facilitate the most expeditious completion of the project in a workmanlike manner.

B. Consult all other relevant specification sections to determine the extent of work specified elsewhere but related to that included herein.

C. Schedule and coordinate all required irrigation utility connections with other project trades and/or utility companies.

D. Obtain information pertaining to location of all proposed lines and accessories prior to irrigation installation.

E. Contractor shall assume responsibility for locating all site utilities, and perform work in a manner to avoid damage.

1.07. PROTECTION OF EXISTING CONDITIONS

A. Any existing structures, equipment, utilities, pavement, landscaping, etc., damaged by Contractor during the course of the work including any subsequent damage caused by leakage or settling of piping shall be restored at Contractor's expense.

1.08 HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
B. Deliver plastic piping in bundles, packed to provide adequate protection of pipe ends, both threaded and plain. Pipe and accessories shall be handled in such manner as to ensure delivery to the trench in sound, undamaged condition. Before installation, the pipe shall be inspected for defects. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method.
C. Store and handle materials to prevent damage and deterioration.
D. Provide secure, locked storage for valves, sprinkler heads, and similar components that cannot be immediately replaced to prevent installation delays.
E. Manufacturer's Specifications: The latest printed specifications of approved manufacturer of materials shall become part of these specifications.

1.09 DESIGN CRITERIA / PERFORMANCE

A. Prior to design of the irrigation system, the contractor shall perform water pressure tests at the site to determine available volume and dynamic pressure. If water pressure and/or volume appear inadequate, reasonable measures such as a booster pump shall be included in system design as part of the bid. If a pump is required only VFD controlled pump solutions will be accepted. If, in the opinion of the bidder, extra-ordinary measures are needed to adequately serve the intended irrigation system, the bidder shall notify the Engineer immediately. Submission of a proposal shall be considered evidence that any water source issues are adequately addressed for proper system performance.
B. The sprinkler system shall cover all landscaped areas and shall be designed to avoid overspray onto paved areas. The sprinkler system shall be completely underground and automatic, capable of providing complete coverage of the area to be irrigated.
C. Irrigation system shall provide 100% coverage for all irrigated areas.
D. Pipe sizes, valve sizes, and zone operation schedule shall provide an economic and efficient system.
E. In sizing lines, allow for pressure loss due to meters, valves, backflow preventer, pipe and fittings, elevation change and all applicable factors. Flow velocities for all lines shall not exceed five (5) feet per second. Pressure available at each head shall be at least the minimum specified by the manufacturer, and shall not exceed the maximum.
F. Seasonal Drainage: The seasonal drainage shall be done by the "Blow-out method" (replacing water with compressed air. The blow-out connections shall utilize a 1" Quick-Coupling valve.
G. Reduced Pressure: Backflow Preventers shall be installed if existing is not sufficient. The contractor shall be responsible for determining the correct size and type of equipment needed to comply with local regulations and include this in the calculations for the design of the sprinkler system.
H. Provisions for winterization of the system shall be included in the design.
I. Provide separate zones for each of the following:
1. Lawn areas.
2. Shrub, Groundcover beds
3. Annual beds.
4. Areas of different exposures

J. Sleeve all irrigation lines below paving with Class 200 PVC. Sleeving shall be at least two sizes larger than pipe contained. Sleeving shall extend at least 12" beyond edge of paving and marked

with an iron post. Wire shall be placed in a separate sleeve, minimum of 1 ½" Class 200 PVC. Design the system to minimize the amount of main lines below pavement.

1.10 EXTRA MATERIALS

A. Provide extra materials as follows:
1. Two extra sprinkler heads of each type and size.
2. Two valve keys for manual valves
3. Two valve box keys.
4. Two keys for valve markers.
5. Two wrenches for each type head core and removing and installing each type head.

PART 2 - PRODUCTS

2.01 MAIN LINE

A. Piping on pressure side of irrigation control valves:
1. Polyvinyl chloride (PVC) 1120-1220, SDR 21 Class 200, and conform to ASTM standards D2241-05 & D2672 or latest revision. Materials shall conform to all requirements of D1784, or latest revision.

2.02 LATERALS

A. Piping on non-pressure side of irrigation control valves:
1. Polyvinyl chloride (PVC) 1120-1220, SDR 21 Class 200, and conform to ASTM ASTM standards D2241-05 & D2672 or latest revision. Materials shall conform to all requirements of D1784, or latest revision.
2. Pipe 1-1/4" and smaller pipe may also be flexible non-toxic polyethylene pipe made for 100% virgin material meeting N.S.F. (National Sanitation Foundation) standard #14 for use in pressure potable water applications, for 800 design stress. All sizes shall have a minimum 100 P.S.I. working pressure rating. All polyethylene pipe shall be continuously and permanently marked with the manufacturer's name, material, size, and schedule. Pipe shall conform to A.S.T.M., D2239, and D1248 (3C5PE34) or latest revision.

2.03 FITTINGS

A. Solvent welded socket fittings conforming to ASTM D 2467 (Schedule 80 PVC) and ASTM D 2466 (Schedule 40 PVC). Threaded type fittings shall conform to ASTM D 2464 (Schedule 80 PVC). Solvent cement shall conform to ASTM D 2564. Risers for rotary or gear driven sprinkler heads shall be 3/4" Flexible PVC, manufactured by AG Products, Sun Valley, CA or approved equal. Burst strength of fittings shall equal or exceed that of the pipe on which they are installed.

2.04 SPRINKLER HEADS

A. Sprinkler heads shall be provided by HUNTER or RAIN BIRD:

B. Sprayheads: Provide 6" pop-up (Pressure compensating with check valve) in lawn areas and 12" pop-up (pressure compensating with check valve) in planting beds. Spray heads shall consist of heavy-duty plastic body, with interchangeable nozzles, pressure activated, multi-function no-flow wiper seal, ratcheting riser for quick arc alignment, heavy duty spring and “pull-ring” flush plug design. Full and part circle spray heads shall have matched precipitation rates. Spray heads shall include internal drain check valve for preventing low head drainage. Adjustable nozzles are only allowed in “odd angle” applications all others shall be fixed arc.

C. Gear Driven Rotary Heads: Provide 6” pop-up. Sprinkler case shall be of heavy-duty plastic construction with plastic or rubber cover with a pop-up height of 6", FloStop Control, Easy arc Adjustment 40-360 degrees, Water lubricated gear drive, extra strong spring and Drain check valve

for up to 10' of elevation change. Match the recipitation rates between full circle and part circle heads when valved together in the same zone. Nozzles shall be interchangeable.

2.05 CONTROL VALVES

A. Remote control valves shall be HUNTER ICV or Rain Bird PEB:
B. Valves shall have Heavy-duty solenoid, High grade construction (150psi rating), Internal manual bleed, Flow control with non-rising handle, Rigid diaphragm support, Globe and angle configurations, Captive bonnet bolts and solenoid plunger and pressure regulator compatible.

2.06 CONTROLLERS

A. The automatic electronic controller shall be universal 'remote-ready' as manufactured by HUNTER or Rain Bird. Controller shall have the capacity of 5 stations more than required.
B. Each controller shall be equipped with remote receiver and transmitter. The controller shall be of a versatile modular design, have a minimum of 4 fully independent programs, independent day schedule options for each program, non-volatile 100 year memory, programmable pump circuit by station, Cycle and Soak capability by station and remote control ready, and operate from a conventional 115-volt service. The controller shall be installed and wired in accordance with the manufacturer's published instructions. Controllers mounted outside shall be either wall mounted or installed with Optional metal pedestal.
C. Controller shall be decoder controller on systems requiring 30, or more, individual stations. Only single station decoders will be accepted.
D. The exact location shall be negotiated between the Owner and Architect while still adhering to the manufacturer's recommendations.

2.07 QUICK-COUPLING VALVES

A. Provide quick coupling valves at locations that allow access to any landscaped area with a 50' length hose.
B. Provide five (5) valve keys fitted with 3/4" swivel hose cells.
C. Quick Coupling Equipment:
1. Valves: One-piece body constructed from heavy-duty cast bronze with a 1" FIP riser connection.
2. Quick Couplers: Single lug coupler of heavy cast bronze and detachable handle.
3. Swivel Hose ELL: Heavy cast bronze, connected to quick couplers for hose connection. Hose ells 1" FIPX 1" Male Hose Threads.
4. Each quick coupler should be installed in a valve box by Ametek (or approved equal) and packed with pea gravel, 4" in depth.

2.08 VALVE BOXES

A. Provide box and cover, with open bottom and openings for piping; designed for installing flush with grade. Include size as required for valves and service. The box shall be of plastic construction with UV protection. Boxes shall be vandal resistant including lockable lid. Permanently label valve box cover, brass or stainless steel tags, with zone number. Box and lid assembly color shall be green color.
B. Accepted manufacturer: Carson – Access Boxes or approved equal.

2.09 CONTROL WIRE

A. Copper with UL approval for direct burial in the ground, size No. 14-1 minimum. Common ground wire shall have a white insulating jacket; control wires shall be a color other than white. All wires place for future use to be of different color than in-use power wires. All wire splices shall occur in a

valve box. Splices shall be made with waterproof connections – 3M DBY-6 and DBY-6 wire connectors.

B. Follow manufactures recommendations while still adhering to minimum wire sizing.

2.10 BACKFLOW PREVENTER

A. Reduced pressure backflow preventer shall be installed in accordance with local codes, and adequately sized for the irrigation system.

2.11 RAIN SENSOR

A. Rain sensor shall cut power supply between timer-controller and 24V solenoid valves after rainfall quantities of 1/8", 1/4", 1/2", 3/4" or 1". Sensor shall be accurate to within + 1/1 6" and will restore power after 2-20 hours, depending on conditions. U.L. listed switch rating of 10.1 amps, 1/4 H.P. at 125/250 VAC.

B. The device shall be mounted in a location unobstructed by walls, trees, or other hindrances (as not to be vandalized). The sensor shall be located as directed by Architect.

2.12 FREEZE SENSOR

A. Freeze sensor shall keep irrigation system from operating during freezing or near freezing temperature. Sensor shall have a temperature set point of 4EC + 3EC (39EF) and a temperature differential of + 1EC. The freeze sensor shall have an electrical rating of 24 VAC 6 amps. Bracket and housing material shall be 6063 aluminum. Location of sensor shall be as directed by Architect.

PART 3 - EXECUTION

3.01 LAYOUT

A. Inspection: Examine existing elevations and conditions of site. Do not begin system design until all existing conditions are satisfactorily understood.

B. Design Pressure: Verify at connection to water supply. Actual working pressure in an individual zone shall fall between manufacturer's recommended minimum and maximum operating pressures for the last sprinkler head in the zone.

C. Design Velocities: Velocity of water in sprinkler system should not exceed 5 fps.

E. Backflow Preventer: Install reduced pressure backflow prevention valve, pump, booster pump, fittings and accessories required to complete the system. Provide union on downstream side. Install in accordance with local codes, and adequately sized for the irrigation system.

F. Meter: The Contractor shall determine if a separate water meter is required for this irrigation system. The Contractor shall determine the size needed for the system design and install according to local standards. The approximate location of this meter shall be determined by the Architect. Prior to system design, verify potential point-of-connection with Architect.

G. Zoning of Irrigation System: Individual zones shall be designed so that total GPM required for zone does not exceed available GPM. System shall be designed so that areas irrigated by individual zones exhibit compatible conditions, including soil type, plant material type and sun exposure. System shall be designed so that sprinkler head types and precipitation rates of sprinklers are compatible on the same zone. System shall not have spray heads on the same zone as rotors.

H. Coverage: Full and complete coverage is required, make necessary adjustments to layout required to achieve full coverage of irrigated areas at no additional cost to the Owner.

I. Connections: Where connections to existing stubouts or sleeves are indicated, make necessary adjustments in layout to connect should stubs or sleeves not be located exactly where shown. Adjust layout as necessary to install around existing work.

J. Pipe Routing: Where piping is shown under paved areas but running parallel and adjacent to planted areas, install piping in planted areas. Do not install directly over another line in same trench.

K. Control Valves: Do not locate control valves in swales where water will be directed into the valve box. Relocate valve as required.

3.02 EXCAVATING AND TRENCHING

A. Perform excavations as required for installation of work. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations, to their original condition.

B. Dig trenches wide enough to allow a minimum 6" between parallel pipelines. Trench sufficient depth to provide minimum cover (18” for all main lines and 12” for all laterals) from finish grade as shown on drawings.

3.03 SLEEVING

A. Install sleeves where control wires and pipes pass through or under walls.

B. Install sleeves for control wiring and pipe under walks and paving.

C. Sleeves to be provided and extend a minimum of 12" beyond edges of walls, walks, and paving.

D. Mark the sleeve ends with an iron post.

E. Place wires in separate sleeve (1 ½” minimum).

F. Coordinate sleeve installation with other trades as required.

3.04 PIPE INSTALLATION

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

1. Solvent-weld PVC pipe and fittings, using primer, solvents, and methods recommended by manufacturer, except where screw connections are required. Clean pipe and fittings of dirt and moisture before assembly. Snake pipe from side to side of trench bottom to allow for expansion and contraction. Make all connections between PVC pipe and metal valves or pipe with threaded fittings using PVC male adapters.
2. Gasket type PVC pipe required on main line sizes 4” and larger.
3. Use Teflon tape only on threaded joints, plastic to plastic and/or plastic to metal. Assemble threaded PVC fittings finger-tight plus one to two turns - no more.

B. Install thrust blocks on main lines (larger than 3”) at locations that make a change of direction.

C. Avoid following piping layout situations:

1. Avoid piping layout along sides of structures.
2. Avoid odd angles in piping layout.
3. Avoid unbalanced friction losses.
4. Avoid high friction losses.
5. Avoid excessive trenching.

3.05 SPRINKLER HEADS

A. Location of Sprinkler Heads: Begin sprinkler head design at areas to be bordered (i.e. back-of-curb, walks, building, etc.). Sprinkler heads adjacent to back-of-curbs shall be located 6” off of curb edge as to prevent damage to head. Fill-in bordered areas with sprinklers. Design for 100% radius (head-to-head) overlap coverage. When possible locate sprinkler heads based on triangular spacing. When possible, locate sprinkler heads so that trees are approximately halfway between heads. Sprinkler heads and quick coupling valves shall be installed perpendicular to grade and level with terrain, unless otherwise indicated. Do not spray buildings or sidewalks.

B. All risers to heads shall be constructed of nipples or elbows to permit height adjustment of head.

C. All heads with 1” or larger inlet shall be installed on manufactured swing joints – 10” minimum.

3.06 ZONE VALVES

A. Remote Control Valves: Install control valves in valve boxes where shown and group together where practical. Place no closer than 12" to walk edges, buildings, and walls. Set valve boxes flush with finish grade.

3.07 CONTROLLERS

A. Install per local code and manufacturer's instructions.
B. Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
C. Affix a non-fading copy of irrigation diagram to cabinet door. Irrigation diagram to be sealed between two sheets of 20 mil (min.) plastic. Irrigation diagram shall be a copy of the as-built drawing and shall show clearly all valves operated by the controller, showing station number, valve size, and type of planting irrigated.
D. Exact field location of controllers to be verified before installation. Coordinate the electrical service to these locations.
E. Mount controller as to allow ease of programming and viewing – provide angle bracket when necessary.
F. Provide a Freeze Sensor and Rain Sensor for each controller; coordinate locations with Architect.

3.08 CONTROL WIRING

A. Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lie to the side of pipeline and tie wires in bundles at 10' intervals and allow Slack for contraction between ties. Provide one control wire per zone.
B. Provide a minimum of 3' of looped extra ground and control wire at each valve and at 200' intervals on long wire runs. Snake wires in trench to allow for contraction of wires.
C. Control wire splices at remote control valves to be crimped and sealed with 3M DBR-6 or 3M DBY-6 wire connectors only.

3.09 FLUSHING AND TESTING

A. Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
B. Thoroughly flush out all water lines before installing heads, valves, and other hydrants.
C. Testing: All instruments, equipment, facilities, and labor required to conduct the tests shall be provided by Contractor. Piping shall be tested hydrostatically before backfilling and proved tight at a hydrostatic pressure of 100 psi without pumping for a period of one hour with an allowable pressure drop of 5 psi. If hydrostatic pressure cannot be held for a minimum of 4 hours, Contractor shall make adjustments or replacements and the tests repeated until satisfactory results are achieved and accepted by the Owner.
D. Upon satisfactory completion of testing, complete assembly and adjust all heads for proper arc and radius.

3.10 BACKFILL AND COMPACTING

A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish.
B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95% density under pavements, 85% under planted areas.
C. Compact trenches in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.
D. Dress off all areas to finish grade.

3.11 CLEANUP

A. Keep areas of work clean, neat, and orderly at all times. Keep paved areas clean during installation. Clean up and remove debris from the entire work areas prior to final acceptance.

B. Protect irrigation system and materials from damage due to performance of work, operations by other contractors, trades and trespassers. Maintain protection during installation and testing period.

C. The Contractor shall be responsible for all damage caused by his operations to trees, shrubs, curbs, paving, structures, utilities, etc., on the site or adjacent to the site of the work and shall repair, replace or otherwise make good any damage caused by their work.

D. The Contractor shall check the system two weeks after acceptance and four weeks after acceptance. The Contractor shall drain the system in the fall following installation, turn it on and completely checking the entire system in the spring following installation.

PART 4 - ACCEPTANCE

4.01 ACCEPTANCE

A. Demonstrate operation of all irrigation zones for the Architect. All irrigated areas are to have 100% coverage. Contractor shall add additional heads, as necessary, at no cost to the Owner. Adjust all heads as required for proper operation, alignment, elevation, radius, and arc.

B. A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of up to 4 hours of normal working time and shall start after the sprinkler system is functionally complete. Field training shall cover all of the items contained in the operating and maintenance manuals.

C. The Contractor will provide on-site consultation with the Owner's operating personnel for a period of 6 months, not to exceed 4 hours per month, at no cost to the Owner. This consultation will be provided at the Owner's request.

4.02 GUARANTEE

A. The entire sprinkler system will be unconditionally guaranteed against defects in material and workmanship, including settling of backfilled areas below grade and adjusting heads to proper level for a period of one year from date of acceptance.

B. In addition to minor adjustments, any defective electrical controls, valves, sprinkler heads or other working parts will be repaired or replaced without cost to the Owner for a period of one year from date of acceptance.

C. Damage by other during the one-year guarantee period will be the Owner’s responsibility.

4.03 RECORD INFORMATION

A. Furnish record drawings of the complete irrigation system.

B. Record Drawings and Controller Chart:

1. Provide a complete set of up-to-date as built drawings, and an electronic copy (AutoCAD release 2003 or newer).
2. Prepare a controller chart showing:
   a. Location of all sections, valves, lateral lines, and routes of control wires.
   b. Identify all valves as to size, station, number, and type of irrigation.
   c. Provide chart as a black-line print with a different color used to show area of coverage for each station.
   d. Locate chart inside controller door. Seal chart between two pieces of plastic.
   e. Complete chart and receive approval prior to final inspection of irrigation system.

END OF SECTION

SECTION 32 9223

TURF AND GRASSES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Sodding

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of grass seed.
   1. Certification of each seed mixture for turfgrass sod.

C. Product certificates.

D. Planting Schedule: Indicating anticipated planting dates for each type of planting.

1.04 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
   1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.06 MAINTENANCE SERVICE

A. Initial Lawn Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established.

PART 2 - PRODUCTS

2.01 TURFGRASS SOD

A. Turfgrass Sod: Complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: State-certified seed of grass species, as follows with not less than 95 percent germination, not less than 85 percent pure live seed, and not more than 0.5 percent weed seed:
1 . 95% - Turf-Type Fescue & 5% - Hybrid Bluegrass

2.02 TOPSOIL

A. Topsoil: See plans and details for specifications.

2.03 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.

F. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.04 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

2.05 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorus, and 2 percent potassium, by weight.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.06 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m.

2.07 PLANTING SOIL MIX

A. Planting Soil Mix: Topsoil mixed with the soil amendments and fertilizers in the quantities per the results of the topsoil analysis.

PART 3 - EXECUTION

3.01 LAWN PREPARATION

A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
   2. Spread planting soil mix to a depth of 12 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
      a. Reduce elevation of planting soil to allow for soil thickness of sod.

B. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
   1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
   2. Loosen surface soil to a depth of at least 8 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
   3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
   4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

   1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
   2. For slopes exceeding 3:1 stabilize as noted on plans.

3.02 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor

cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:3 with or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.03 LAWN MAINTENANCE

A. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations until Substantial Completion. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

B. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings.

3.04 SATISFACTORY LAWNS

A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.

C. Use specified materials to reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

END OF SECTION

SECTION 32 9300

EXTERIOR PLANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Trees.
   2. Shrubs.
   3. Ground cover.
   4. Plants.

1.02 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product certificates.

C. Dyed, double-ground hardwood mulch sample.

D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year.

1.04 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
   1. Report suitability of topsoil for plant growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery and handling.

B. Handle planting stock by root ball.

C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist.

1.06 WARRANTY

A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace plantings that fail in materials, workmanship, or growth within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
      b. Structural failures including plantings falling or blowing over.

   2. Warranty Periods from Date of Substantial Completion:
      a. Trees and Shrubs: One year.
      b. Ground Cover and Plants: One year.

1.07 MAINTENANCE SERVICE

A. Initial Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
   1. Maintenance Period for Trees and Shrubs: One year from date of Substantial Completion.
   2. Maintenance Period for Ground Covers and Plants: One Year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1.

C. Provide balled and burlapped and/or container-grown trees as indicated on Plant Schedule.

D. Shrub sizes indicated on Plant Schedule are sizes after pruning.

2.02 GROUND COVER PLANTS

A. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.

2.03 PLANTS

A. Annuals: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

B. Perennials: Provide healthy, field-grown plants from a commercial nursery, of species and variety shown or listed, complying with requirements in ANSI Z60 1.

2.04 TOPSOIL

A. Topsoil: ASTM D 5268, pH of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth:
   1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps and other extraneous materials harmful to plant growth.
      a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient.
   2. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.
   3. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps and other extraneous materials harmful to plant growth.
      a. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources.

2.05 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.

F. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.06 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

2.07 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.08 MULCHES

A. Organic Mulch: Double-ground hardwood mulch; color: died brown. Provide sample to landscape architect for approval prior to installation

2.09 EDGING

A. Unless otherwise indicated, all landscape beds shall have shovel cut edging.

2.10 PLANTING SOIL MIX

A. Planting Soil Mix: Mix topsoil with the soil amendments and fertilizers in the quantities per the results of the topsoil analysis.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive exterior plants for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.
B. Provide and maintain existing on-site erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
C. Lay out individual tree and shrub locations and areas for multiple exterior plantings. Stake locations, outline areas, adjust locations when requested, and obtain the architect's acceptance of layout before planting. Make minor adjustments as required.
D. Apply anti-desiccant to trees and shrubs using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
   1. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting.

3.03 PLANTING BED ESTABLISHMENT

A. Loosen subgrade of planting beds to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   1. Apply fertilizer directly to subgrade before loosening.
   2. Spread topsoil (if necessary), apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
      i. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
    i. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.

B. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Restore planting beds if eroded or otherwise disturbed after finish grading and before planting.

3.04 TREE AND SHRUB EXCAVATION

A. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit glazed or smoothed during excavation.
    1. Excavate at least 12 inches wider than root ball or container.

B. Subsoil removed from excavations may be used as backfill.

C. Obstructions: Notify the architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
    1. Hardpan Layer: Drill 6-inch diameter holes into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify the architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.05 TREE, SHRUB AND MISCELLANEOUS PLANTS PLANTING

A. Set balled and burlapped stock plumb and in center of pit or trench with top of root ball 1 inch above adjacent finish grades.
    1. Remove burlap and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
    2. Place backfill around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

B. Set container grown stock plumb and in center of pit or trench with top of root ball flush with adjacent finish grades.
    1. Carefully remove root ball from container without damaging root ball or plant.
    2. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

C. Mulching: Apply 3 inch average thickness of mulch extending 12 inches beyond edge of planting pit or trench. Do not place mulch within 3 inches of trunks or stems.

D. Wrap trees of 2-inch caliper and larger with trunk-wrap tape. Start at base (bottom) of trunk and spiral cover trunk to height of first branches. Overlap wrap, exposing half the width, and securely attach without causing girdling. Inspect tree trunks for injury, improper pruning, and insect infestation; take corrective measures required before wrapping.

3.06 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as directed by the architect.
B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise indicated by the architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.

STAKING AND GUYING

A. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip-out. Use a minimum of 2 stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 48 inches above grade. Set vertical stakes and space to avoid penetrating root balls or root masses. Support trees with two strands of tie wire connected to nylon webbing guard. Allow enough slack to avoid rigid restraint of tree. Place stakes in north-south axis where only 2 are needed. Keep look consistent and neat. Use the number of stakes as follows:
    1. Use 1 stake per caliper inch or 3' height increment thereof. Space stakes equally around trees.
    2. Attach plastic flagging tape to tie wire centered between each stake and trunk.

3.07 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants as indicated in plant list or plan.
B. Dig holes large enough to allow spreading of roots, and backfill with planting soil.
C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.08 PLANTING BED MULCHING

A. Mulch backfilled surfaces of planting beds and other areas indicated.
    1. Mulch: Apply 3 inch average thickness of mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.

3.09 CLEANUP AND PROTECTION

A. During landscape work, keep pavements clean and work area in an orderly condition.
B. Soil or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly, keeping the area clean at all times. Upon completion of the planting, excess soil, stones and debris which have not previously been cleaned up shall be removed from the site or disposed of, as directed by the Owner's Representative. Ground areas disturbed as a result of planting operations shall be restored to their original condition or to the desired new appearance.
C. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed by the architect at no additional cost, unless damage is the result of vandalism.

3.10 DISPOSAL

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

3.11 PLANT MAINTENANCE

A. Tree and Shrub Maintenance: Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Ground Cover and Plant Maintenance: Maintain and establish plantings by watering, weeding, fertilizing, mulching, and other operations as required to establish healthy, viable plantings.

C. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

END OF SECTION