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OWNER:

City of Montverde
17435 5th Street
Montverde, Florida 34756
PH: (407) 469-2681

ARCHITECT:

GatorSketch Corporation
1000 E. Highway 50, Suite 201A
Clermont, Florida 34711
PH: (407) 608-5677

**STRUCTURAL
ENGINEER:**

Bowen Engineering Corp.
1528 Vassar St.
Orlando, Florida 32804
PH: (407) 423-7585

**MECHANICAL,
ELECTRICAL,
PLUMBING &
SYSTEMS
ENGINEERS:**

Hackenberg Engineering
481 Shepherd Ave.
Winter Park, Florida 32789
PH: (407) 227-1973

August 21, 2023

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SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Type of the Contract.
 - 3. Use of premises.
 - 4. Owner's occupancy requirements.
 - 5. Work restrictions
 - 6. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Location and Identification: Town of Montverde – Helen Lehmann Library
17435 5th street, Montverde, Florida 34756
- B. Owner: Town of Montverde
 - 1. Owner's Representative: Paul Larino – Town Manager
- C. Architect: GatorSketch Corporation, 1000 E. Hwy 50, Suite 201A, Clermont, Florida 34711.
- D. General Contractor: To be determined.
- E. Scope of Work:
 - 1. Site Work shall include final grading, including building pad preparation and utilities connections. The Town of Montverde will provide other site improvements including driveways, parking lots, sidewalks, storm drainage, landscape and irrigation.
 - 2. Library Building – New 7,718 S.F. One story with book collections rooms, circulation desk, tutorial rooms, offices, breakroom, toilet rooms, porch, breezeway and support spaces. Construction Type VB (no Fire Sprinkler system). 8” CMU exterior walls, interior gyp.bd. partitions and standing seam metal roof system over pre-engineered wood roof trusses.

1.4 TYPE OF CONTRACT

- A. Project shall be constructed under a single Prime Contract between Owner and Contractor(s).

1.5 WORK PHASES

- A. The Site Work shall be conducted in one phase.

1.6 PROJECT MANAGEMENT AND ADMINISTRATION

1. See Specification Sections 01 31 00 - Project Management
2. Section 01 33 00 Submittal Procedures
3. See Specification 01 29 00 – Payment Procedures for the requirements for Initial Payment Application and subsequent applications including applications for Substantial and for Final Completion.

1.7 USE OF PREMISES

- A. General: Contractor shall have use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of the Project site.

1.8 OWNER'S OCCUPANCY REQUIREMENTS

- A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of the site, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1.9 Owner Furnished Products

- A. Owner will furnish equipment, fixtures, furniture and products indicated on drawings. Contractor's scope of work includes providing support systems to receive Owner's equipment & making plumbing, mechanical & electrical connections.
1. Owner will arrange and pay for delivery of Owner-furnished items in coordination with the Contractors' Construction Schedule.
 2. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
 3. If Owner-furnished items are damaged, defective or missing, Owner will arrange for replacement.
 4. The Contractor is responsible for protecting Owner – furnished items from damage during storage and handling, including damage from exposure to elements.
 5. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.10 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 A.M. to 6:00 P.M., Monday through Friday, except as otherwise approved or indicated.
1. Weekend and Early Morning Hours: Coordinate requirements with Owner and with authorities having jurisdiction for restrictions governing noisy work.
 2. Hours for Utility Shutdowns: Not less than 48 hours in advance, coordinate proposed utility shutdowns with Owner and with utility companies and authorities having jurisdiction.

3. Hours for Core Drilling: Coordinate requirements with Owner and with authorities having jurisdiction for restrictions governing noisy work.

1.11 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 2004 format and CSI/CSC's "MasterFormat" numbering system.
 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

END OF SECTION 01 10 00

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SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01 Section “Product Requirements” for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 2. Section 01 Section “Closeout Procedures for submitting warranties for Contract Closeout.
 - 3. Divisions 2 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. A statement indicating why specified product or fabrication or installation cannot be provided, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - b. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. Certificates and qualification data, where applicable or requested.

- f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research reports evidencing compliance with building codes in effect for Project.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to perform adequately.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 calendar days of receipt of a request for substitution. Architect will notify General Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
3. Owner shall review "Contractor's Request for Substitution" and supporting documentation received. Owner has the right to: (1) approve the substitution request if the Architect has approved the request or (2) disapprove the request agreeing with the Architect's disapproval or (3) not approve the substitution request, even if the Architect has approved the request.

1.1 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.2 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but no later than 45 calendar days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect, subject to final written approval/rejection by Owner.
 1. Conditions: Architect and Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return

requests without action, except to record noncompliance with these requirements. Contractor shall provide written certification that:

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h.
2. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 3. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

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SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include:
 - 1. Division 01 Section, "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time 20 days after receipt of Proposal Request, submit a quotation estimating adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the

Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
5. Comply with requirements in Division 01 Section, "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 Change Order form with supporting attachments.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section, "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 01 Section, "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.
 - 3. Division 01 Section, "Closeout Procedures" for administrative requirements governing final closeout documentation.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Separate Schedules of Values shall be provided for the site work and each individual building as directed by the Owner for the distribution of funds from appropriate funding sources. The construction costs for connected Buildings B, C & D shall be allocated based on the Building Match Lines indicated on the Construction Drawings. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than fourteen (14) days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Sub-schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work; provide sub schedules showing values coordinated with each element.

- B. Format and Content: Use the Schedules of Values provided in the Bid Documents and the Project Manual table of contents as a guide to establish line items for the Schedules of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Submit draft of AIA Document G703 Continuation Sheets.
 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value: Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
 7. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training.
 8. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each application shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Architect by the 25th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment as directed by Owner.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
 - 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.

2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
 16. Initial settlement survey and damage report if required.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 - a. All Project Closeout items specified in Specification Section 01 77 00, Closeout Procedures shall be required to be in full compliance before the retention being released to no less than five percent (5%) of the Contract Sum.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment. "Evidence that claims have been settled.
 7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 8. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 – PROJECT MANAGEMENT

PART 1 - GENERAL

- A. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-installation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Project closeout activities.

1.2 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 2. Sheet Size: At least 8 ½ by 11 inches but no larger than 30 by 40 inches.
 3. Submit electronic documents of each submittal to Architect.
 - a. Include electronic documents with Project Record Drawings
 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses,

and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times. Provide electronic copy to Owner and Architect during Pre-Construction Conference.

1.3 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Include special personnel required for coordination of operations with other contractors.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.

- B. Preconstruction Conference: Owner shall schedule a preconstruction conference before starting construction, at a time convenient to Owner, Contractor, and Architect, but no later than fifteen (15) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for requests for interpretations (RFIs).
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.

- l. Work restrictions.
 - m. Owner's occupancy requirements.
 - n. Responsibility for temporary facilities and controls.
 - o. Construction waste management and recycling.
 - p. Parking availability.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. First aid.
 - t. Security.
 - u. Progress cleaning.
 - v. Working hours.
3. Minutes: Contractor will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Options.
 - c. Related requests for interpretations (RFIs).
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for interpretations (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
 3. Minutes: Contractor shall record and distribute to meeting attendees the meeting

- minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at] regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

- 1. Preliminary Construction Schedule.
- 2. Contractor's Construction Schedule.
- 3. Submittals Schedule.
- 4. Daily construction reports.
- 5. Material location reports.
- 6. Field condition reports.
- 7. Special reports.

- B. Related Sections include the following:

- 1. Division 01 Section, "Payment Procedures" for submitting the Schedule of Values.
- 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
- 3. Division 01 Section, "Submittal Procedures" for submitting schedules and reports.
- 4. Division 01 Section, "Photographic Documentation" for submitting construction photographs.
- 5. Division 01 Section, "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

- 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
- 2. Predecessor Activity: An activity that precedes another activity in the network.
- 3. Successor Activity: An activity that follows another activity in the network.

- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is a shared commodity.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- G. Major Area: A story of construction, a separate building, or a similar significant construction element.
- H. Milestone: A key or critical point in time for reference or measurement.
- I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.4 SUBMITTALS

- A. Qualification Data: For scheduling consultant.
- B. Submittals Schedule: Submit 1 copy of schedule on paper as well as electronic formats. Electronic submittal shall be in PDF format as well as the native scheduling software. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- C. Preliminary Network Diagram: Schedule shall show entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule to show the entire construction period.
 - 1. Submit an electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit the following computer-generated reports on paper as well as electronic formats. Electronic submittal shall be in PDF format as well as the native scheduling software. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- F. Daily Construction Reports: Submit in electronic PDF format at weekly intervals.
- G. Material Location Reports: Submit in electronic PDF format at weekly intervals.
- H. Field Condition Reports: Submit in electronic PDF format at time of discovery of differing conditions.
- I. Special Reports: Submit in electronic PDF format at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Contractor shall conduct conference at Project site to comply with requirements in Division 01 Section, "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing, work stages area separations, interim milestones, and partial Owner occupancy.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review time required for review of submittals and resubmittals.
 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 8. Review time required for completion and startup procedures.
 9. Review and finalize list of construction activities to be included in schedule.
 10. Review submittal requirements and procedures.
 11. Review procedures for updating schedule.
 12. Review time required for Owner's installation of FF&E.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
3. Coordinate with Owner's vendors. (FF&E, low voltage technology, etc.)

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Structural Steel Framing.
 - b. Steel Roof Decking.
 - c. Roofing.

- d. Doors – framing, fabrications and hardware.
 - e. Laboratory, Lab equipment and casework.
 - f. Windows – framing, fabrication and hardware.
 - g. Mechanical Equipment.
 - h. Electrical Equipment.
 - i. Fire Alarm (FA), Security, Access Control, Energy Management Systems.
 - j. Kitchen Equipment
 - k. Chillers
3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than 15 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 6. Final Completion: Indicate Final Completion date established in Contract from Date of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Products Ordered in Advance: Include a separate activity for each product. Indicate the earliest possible delivery date.
 4. Owner-Furnished Products: Include a separate activity for each product. Indicate the earliest possible delivery date.
 5. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 - i. FF&E installation.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.

- j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
7. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.
- 1. Primavera Project Planner or equivalent.
- H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)
- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction
Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
- 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and start up.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 5. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.

- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.
8. Indicate target dates.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received and implemented.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial Completions and occupancies.
17. Substantial Completions authorized.

- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage installed.
3. Material stored following previous report remaining in storage.

- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation on AIA G711 or similar form. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute

copies of report to parties affected by the occurrence.

- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, and response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
 - 3. Provide electronic copy to Owner.

END OF SECTION 01 32 00

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SECTION 01 32 33 – PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements. Aerial photographic documentation shall be provided for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final Completion construction photographs.

1.3 SUBMITTALS

- A. Qualification Data: For photographer.
- B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph.
- C. Construction Photographs: Submit electronic file of each photographic view within 7 days of taking photographs.
 - 1. Format: Submit digital image electronic files ‘
 - 2. Identification: For each submittal provide the following information:
 - a. Name of Project.
 - b. Name and address of photographer.
 - c. Name of Architect
 - d. Name of Contractor.
 - e. Date photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Unique sequential identifier.
 - h. Include graphic scale of aerial photograph.

1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional aerial photographer of construction projects for not less than three years.

1.5 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

1.6 PRINTS

- A. Digital Images: Photographer shall retain photographic images for 3 years after date of Substantial Completion. During this period, photographer shall fill orders by Architect, or Owner for prints. Photographer shall price prints at prevailing local commercial prices.
- B. Prints: If requested by Architect or Contractor, photographer shall prepare prints of photographs. Photographer shall distribute these prints directly to designated parties who will pay the costs for the prints.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in uncompressed JPEG format, produced by scanning of the original photographic film and at an image resolution of not less than 1600 by 1200 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified commercial photographer to take aerial construction photographs.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in filename for each image.
 - 2. Field Office Images: Maintain one set of images in the field office at Project Site, available at all times for reference. Identify images same as for those submitted to Architect.
- D. Preconstruction Photographs: Before starting construction, take color photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Contractor shall flag construction limits before taking construction photographs.
 - 2. Take 3 color photographs, different views, to show existing conditions adjacent to property before starting the Work.
 - 3. Take 3 color photographs, different views, of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
- E. Time-Lapse Sequence Construction Photographs: Take 3 color photographs, different views, to show status of construction and progress since last photographs were taken.

1. Frequency: Coinciding with the cutoff date associated with each Application for Payment, take a minimum of (3) aerial photographs and (12) photographs from ground level monthly. The photographs shall clearly depict construction that has been completed within the pay period.
 2. Photographs shall be taken from similar vantage points in succeeding months in order to more clearly show the progress of Work.
- F. Final Completion Construction Photographs: Take 3 color photographs, different views, after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 33

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SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section, "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 01 Section, "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section, "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 01 Section, "Photographic Documentation" for submitting construction photographs.
 - 5. Division 01 Section, "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 6. Division 01 Section, "Closeout Procedures" for:
 - 1) Submitting warranties.
 - 2) Submitting Record Drawings, Record Specifications, Operation and Maintenance Manuals.
 - 7. Divisions 02 through 33 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Submittals shall be provided electronically directly to the Architect/Engineer from the General Contractor.
 - 1. All shop drawings and other submittals as specified herein, shall be submitted in electronic format. All electronic CAD generated drawings shall be in DWG format and all product data and other required information shall be submitted in Acrobat PDF format. Coordinate with Architect / Engineer before submitting. All electronic

submittals shall be posted as directed by the Architect.

- B. Electronic copies of CAD Drawings of the Contract Documents will not be provided by the Architect / Engineer for the Contractor's use in preparing submittals.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Resubmittal Review: Allow 15 days for review of each resubmittal.
- F. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06 10 00.01.A).
 - i. Number and title of appropriate Specification Section.

- j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- G. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- H. Additional Copies: Submit one (1) hard copy once approved for legal seal stamping, if required by authorities having jurisdiction. Coordinate with Architect / Engineer and Owner.
- I. Electronic Transmittal: Package each submittal individually and appropriately for electronic transmittal. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
- 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name, Architect' Project Number.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
 - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked "Reviewed" with no further action noted.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals with mark indicating "Reviewed" with no exception taken or other similar language.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Submit one (1) hard copy once approved for legal seal stamping, if required by authorities having jurisdiction. Coordinate with Architect / Engineer and Owner.
 2. Electronic file “save” sequence for submittals of product data, shop drawings and/or other product information shall be identified as follows: Architect’s Project Number, 6-digit Specification Section number, Specification Section Name. (i.e. C0015_08 7 1 00_ Door Hardware).
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 4. Submit Product Data before or concurrent with Samples.
 5. Number of Samples: Submit 2 sample of each Product, unless otherwise indicated. Architect will return 1 sample. Mark up and retain sample as a Project Record.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.

- k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets at least 8 ½ by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit one (1) electronic copy of each submittal. Architect will return 1 electronic copy. Mark up and retain as a Project Record Drawing.
 4. Submit one (1) hard copy once approved for legal seal stamping, if required, at jobsite. Coordinate with Architect / Engineer and Owner.
- D. Samples: Submit samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved samples at Project site, available for quality- control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 4. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit 2 sets of samples. Architect will retain 1 sample set; the other will be returned. Mark up and retain returned Sample set as a Project Record Sample.
 - 1) Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit at least 3 sets of

paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit one electronic copy of product schedule or list, unless otherwise indicated. Architect will return a copy.

a. Mark up and retain returned copy as a Project Record Document.

F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit an electronic copy of the subcontractor list, Architect will return a copy.

a. Mark up and retain returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit 1 copy of each "PDF" submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section, "Quality Requirements."
4. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
5. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
6. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- B. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents.
1. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that the product complies with requirements in the Contract Documents.
 2. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 3. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- C. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
 8. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents
 9. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified."
 10. Design Data: Prepare written and graphic information, including, but not limited to, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design guidelines and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
 11. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - a. Preparation of substrates.
 - b. Required substrate tolerances.
 - c. Sequence of installation or erection.

- d. Required installation tolerances.
 - e. Required adjustments.
 - f. Recommendations for cleaning and protection.
12. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
- a. Name, address, telephone number of service making report.
 - b. Statement on condition of substrates and their acceptability for installation of product.
 - c. Statement that products at Project site comply with requirements.
 - d. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - e. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - f. Statement whether conditions, products, and installation will affect warranty.
 - g. Other required items indicated in individual Specification Sections.
- D. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- E. Submittal Register: Contractor shall provide submittals indicated in Submittal Register.
1. Mix Design.
 2. Test Data
 3. Shop Drawings.
 4. Coordination Drawings
 5. Product Data
 6. Samples
 7. Mockups
 8. Schedules
 9. Spare Parts, Etc.
 10. Manufacturer's Instructions
 11. Manufacturer's Certifications
 12. Test and Balance Report
 13. Operating and Maintenance Data
 14. Manufacturer's Warranty
- F. Operating and Maintenance (O&M) Manual Requirements Register:
General Contractor shall prepare O&M Manual Requirements listing all submittal items required for approval by Architect, but not limited to, the following:
1. List Arch, Civil, Mech., Elect., Fire Protection Engineers.
 2. Volume (1 or 2 of each discipline, as needed)
 3. Section (See Project Manual TOC)
 4. Name (See Project Manual TOC)
 5. Cover Page
 6. Table of Contents
 7. Names, Addresses of Contacts
 8. Warranty terms (i.e. 60 day, 1 yr., 3 yr., 3 yr., Other)

9. Shop Drawings/Submittals
10. Test Reports
11. O&M Instructions
12. Service & Maintenance. Contracts

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. Reviewed with No Exceptions Taken
 2. Reviewed and Released with Corrections
 3. Revise and Resubmit
 4. Insufficient Information
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

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SECTION 01 40 00 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Requirements for Contractor to provide threshold building inspection services in accordance with Florida Statute.
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Divisions 02 through 50 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination,

testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- E. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- F. Experienced: When used with an entity, "experienced" means having successfully completed similar projects in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards or requirements is specified and they establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. If compliance with two or more quantities or qualities is specified and they establish different or conflicting requirements, comply with the most stringent requirement (highest quality / maximum quantity). Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

- C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- E. Contractor to forward all Factory start up reports for all mechanical Equipment, Duct pressure test forms and Chilled water pipe flushing procedures and final tests to the CXA. Refer to section 01 91 13 'General Commissioning Requirements'.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems 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. Fabricator Qualifications: A firm experienced in producing products 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.
- E. 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 the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities that are recognized experts in those operations. Specialists shall

satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An UL, NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. UL: Underwriters Laboratories, Inc., a nationally recognized testing laboratory.
 2. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 3. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow 7 days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.
- I. Testing and balancing service shall be in accordance with the contract requirements.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made by Owner to testing agency.
 3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control

services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Commissioning Authority and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.

G Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

H.Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. Schedule times for tests, inspections, obtaining samples, and similar activities. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within **30** days of date established for the Notice to Proceed Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required. T.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

- a. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
- b. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
- c. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
- d. Submitting a final report of special tests and inspections at Substantial Completion, this includes a list of unresolved deficiencies. All deficiencies shall be included in Project Deficiency Log for resolution tracking purposes. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents. Retesting and re-inspecting corrected work.

PART 2 - EXECUTION

2.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.

3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
 5. Specification Section number and title.
 6. Project name and number.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

2.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

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SECTION 01 42 00 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. No limitation on location is intended.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's responsibility into Contractor's area of construction supervision.
- D. "Approve": Only the Owner can approve or disapprove contract actions. Even if the specifications indicate that an individual other than the Owner (such as the Architect) will approve or disapprove an action, it is understood that only the Owner has this authority unless the individual is so designated by him in writing. Even when an individual is so designated, the Contractor may appeal the actions to the Owner and the Owner's decision shall be final. In no case will "approval" by the Owner be interpreted as a release of the Contractor from responsibility to fulfill requirements of the Contract Documents.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- 1 The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects, or as indicated in individual specification sections, similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2 Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies, Laboratories or Service": All terms interchangeably refer to an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- L. "Nationally Recognized Testing Laboratories": The term "nationally recognized testing laboratory (NRTL)" shall mean a firm or organization which is recognized by OSHA in accordance with 29 CFR Part 1910.7 to test and approve (i.e., certify, label or list) equipment or materials as being safe for the intended use. Labeling and/or listing of products by NRTL is acceptable wherever a reference to the UL or FMRC label is made in the specifications.
- M. "Label": The label must be provided by a nationally recognized testing laboratory. The Contractor shall provide a statement from the testing laboratory attesting that the laboratory has been approved by OSHA to certify the category of product(s) being submitted for approval.

1.3 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and sections using CSI's "MasterFormat 2004" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1 Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2 Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - (a) The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
 - 1 Reference standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the work.
 - 2 Unreferenced Standards: Except as otherwise limited by the contract documents, standards not referenced but recognized in the construction industry as having direct applicability will be enforced for performance of the work. The decision as to whether an industry code or standard is applicable, or as to which of several standards are applicable, is the sole responsibility of the Architect.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
 - 1 Updated Standards: Submit a change order proposal where an applicable

industry code or standard has been revised and reissued after the date of the Contract Documents and before the performance of the work affected. The Architect will decide whether to issue a change order to proceed with the updated standard.

C. **Conflicting Requirements:** Where compliance with two or more standards or requirements is specified and they establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect for a decision before proceeding with the work.

1 **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

2 The Architect is the sole interpreter of what constitutes "minimum requirements" in any given situation. Exceeding minimum requirements in one or more aspects of any given specification does not cancel or replace the need to meet minimum requirements of any other aspect of that specification.

D. **Copies of Standards:** Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1 Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decision having a

bearing on the work.

1.6 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2) - PRODUCTS (Not Applicable)

PART 3) - EXECUTION (Not Applicable)

END OF SECTION 01 4200

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SECTION 01 50 00 – TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes requirements for temporary services and facilities, including temporary utilities, support facilities, security and protection.

- B. Temporary utilities include, but are not limited to, the following:

- 1 Water service and distribution.
- 2 Temporary electric power and light.
- 3 Temporary heat.
- 4 Ventilation.
- 5 Telephone service.
- 6 Sanitary facilities, including drinking water.
- 7 Storm and sanitary sewer.

- C. Temporary construction and support facilities include, but are not limited to, the following:

- 1 Field offices and storage sheds.
- 2 Temporary enclosures.
- 3 Temporary project identification signs and bulletin boards.
- 4 Construction aids and miscellaneous services and facilities.

- D. Security and protection facilities include, but are not limited to, the following:

- 1 Temporary fire protection.
- 2 Barricades, warning signs, and lights.
- 3 Site enclosure fence.
- 4 Environmental protection.

1.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

- 1 Building Code requirements.
- 2 Health and safety regulations.

- 3 Utility company regulations.
- 4 Police, Fire Department, and Rescue rules.
- 5 Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

- 1 Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electrical Code."

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1 Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2 Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3 Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
 - 1 Sterilization: Sterilize temporary water piping prior to use.
 - 2 When non-potable water is used, mark each outlet with hazardous warning signs.
 - 3 Insure that any temporary water hook up has all the proper backflow protection.

- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
 - 1 Power Distribution System: Install wiring where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
 - 1 Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

- E. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

- F. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

- G. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.

- H. Sanitary facilities include temporary toilets, wash facilities, and drinking- water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
 - 1 Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

- I. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-

type privies will not be permitted.

- 1 Provide separate facilities for male and female personnel.
- J. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
 - 1 Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
- K. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
 - 1 Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degrees F.
- L. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1 Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2 Connect temporary sewers to the municipal system, as directed by sewer department officials.
 - 3 Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- M. Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.
 - 1 Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion or under conditions acceptable to the Owner.
- B. Contractor's Facilities: Provide field office buildings and sheds adequate in size and accommodation for all Contractor's offices, supply and storage.
 - 1 All the temporary facilities, except for Owner furnished or Owner purchased furniture and equipment, will remain the property of the Contractor and shall be removed from the site after completion of the work.
- C. Temporary Enclosures: Provide temporary enclosures for protection of construction, in

progress and completed, from exposure, foul weather, other construction operations, and similar activities.

- 1 Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- 2 Protection and temporary closures shall be provided at all exterior openings in the building including doors, walls and roof to maintain the building weather and dust tight. All protection shall be substantial so that it will not be disturbed by wind and weather normal to the area and season.
- 3 Openings in floors shall be protected and closures provided to prevent floor to floor transfer of dust, debris and conditioned air. Conform to fire and safety regulations of the authorities having jurisdiction.

D. Project Identification Signs: Furnish and install and maintain project identification signs in quantity designated by the Owner. Signs shall consist of a 4-foot by 8-foot by 3/4-inch plywood on a 4x supporting structure painted and installed in designated locations. All wood to be pressure treated.

- 1 Comply with Florida Building Code, latest edition for wind load requirements.
- 2 Finishes and painting materials shall be adequate to resist weathering and fading for the scheduled construction period.
- 3 Exact design, text and colors shall be provided by the Architect and will include the name of the building and of the Owner, emblems or photographs selected by the Owner, names and logos of the Architect and principal sub-consultants, and the name and logo of the General Contractor.
- 4 Maintenance: Maintain signs and supports in a neat, clean condition, and repair damages to structure, framing or sign as required.
- 5 Relocate signs as required by progress of the work. Remove signs, framing, supports and foundations at project completion.

E. No other signs or advertising of any kind shall be allowed on the job site, except as specifically approved by the Owner & Architect.

F. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when work is being performed.

G. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.

B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for

Safeguarding Construction, Alterations, and Demolition Operations."

- 1 Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2 Store combustible materials in containers in fire-safe locations.
 - 3 Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 - 4 Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- D. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate as indicated on the Site Use Plan. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
- 1 Provide open-mesh, chain-link fencing, minimum 6 feet high and complete with all required bracing, with posts set in a compacted mixture of gravel and earth.
 - 2 Maintain fence and gates throughout the construction period and remove at the end of the project, unless otherwise indicated by Architect.
 - 3 Repair any damage caused by installation and removal, and restore area to original or specified condition.
- E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- 1 Storage: Provide a secure lockup where materials and equipment must be stored. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- F. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
- 1 Maintain operation of temporary enclosures, heating cooling, humidity

control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

- 2 Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

B. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

- 1 Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.

END OF SECTION 01 50 00

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SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes administrative and procedural requirements for selecting products and handling requests for substitutions made after award of the Contract.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1 Division 1, REFERENCES specifies the applicability of industry standards to products specified.
 - 2 Division 1, SUBMITTAL PROCEDURES specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1 Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2 New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3 Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

- 1 Revisions to the Contract Documents requested by the Owner or Architect.
 - 2 Specified options of products and construction methods included in the Contract Documents.
 - 3 The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.
- D. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- E. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- F. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

- A. Materials, products, equipment and systems are specified in the Contract Documents by manufacturer, trade name or distributor to establish a standard of the required criteria, including function, performance, dimension, appearance and quality to be met by any proposed substitution. The burden of proof of merit of proposed substitute is upon the proposer. Substitute items shall not be incorporated in the work without prior written approval of the item by the Architect.
- B. Where an item is specified by one or more manufacturer's model number or specific item identification and "or approved equal" is included, only the item(s) that is specified by manufacturer's model number or specific identification is approved and any other item must be submitted for approval as a substitution.
- C. Where an item is specified by a referenced standard, the item must be submitted for approval same as a substitute.
- D. Submit electronic copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
- E. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and drawing numbers.
- F. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
- 1 Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate

- contractors, that will be necessary to accommodate the proposed substitution.
- 2 A detailed comparison of significant qualities of the proposed substitution with those of the work specified. Significant qualities may include elements such as performance, weight, size, durability, and visual effect.
 - 3 Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - 4 Samples, where applicable or requested.
 - 5 A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - 6 Cost information, including a proposal of the net change, if any in the Contract Sum.
 - 7 The Contractor's certification that the proposed substitution conforms to or exceeds requirements in the Contract Documents in every respect and is appropriate for the applications indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
- G. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
- 1 Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 - 2 Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3 Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

- 4 Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
 - (a) Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
 - 5 Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
- B. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
- 1 Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 - 2 Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces.

2.2 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
- 1 The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.
 - 2 The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting offsetting responsibilities the Owner may be required to bear. The Owner's additional responsibilities may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 - 3 The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 - 4 The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor

certifies that the substitution will overcome the incompatibility.

- 5 The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
 - 6 The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- B. The Contractor's submittal and the Architect's acceptance of shop drawings, product data, or samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.
- C. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

PART 3) - EXECUTION (Not Applicable)

END OF SECTION 01 60 00

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SECTION 01 73 00 – EXECUTION

PART 1 - GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

- 1. Construction layout.
- 2. Field engineering and surveying.
- 3. General installation of products.
- 4. Coordination of Owner-installed products.
- 5. Progress cleaning.
- 6. Starting and adjusting.
- 7. Protection of installed construction.
- 8. Correction of the Work.

- B. Related Sections include the following:

- 1. DIVISION 01 SECTION, SUBMITTAL PROCEDURES for submitting surveys.
- 2. DIVISION 01 SECTION, CUTTING AND PATCHING for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor: The land survey shall be drawn to ALTA specifications.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
 - 1. Hazardous materials shall be disposed of in strict accordance with State and Federal Requirements and Codes and Regulations.
- D. Certified Surveys: Submit 2 copies signed by land surveyor.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A Professional land surveyor who is legally qualified to

practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

1.5 EQUIPMENT PROTECTION

- A. Contractor to keep all MEP equipment on site with self-adhesive plastic wrapping material to prevent dirt, debris and other matter from collecting on the interior surfaces of the equipment.

1.6 CUTTING AND PATCHING

A. Cutting and Patching Proposal: Submit electronic proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work. Report any materials that appears to be hazardous.

1. Before construction, verify the location and points of connection of utility services. Also identify process for hazardous material abatement on the submitted schedule.

- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for

changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 5. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of **2** permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. 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.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- I. Vibratory rolling will not be allowed where there is the potential to damage adjacent structures.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Pre-installation Conferences: Include Owner's construction forces at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 90 degrees F. This at the discretion of the Contractor and approval by the Owner and in accordance with all State and Local Codes and regulations.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean where work is in progress as necessary for proper execution of Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment and operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in DIVISION 1 SECTION, QUALITY REQUIREMENTS.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in DIVISION 01 SECTION, CUTTING AND PATCHING.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 70 00

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SECTION 01 73 10 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes administrative and procedural requirements for cutting and patching.
- B. Related Sections: The following sections contain requirements that relate this section:
 - 1 Refer to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the work. Refer to Division 23 and Division 26 sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio. Obtain approval of the Architect before cutting and patching any structural elements.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety. Obtain approval of the Architect before cutting and patching any operating elements or safety related systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would reduce the building's aesthetic qualities or result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner, as judged by the Architect, at no additional cost to the Owner.
 - 1 Engage the original Installer or fabricator to cut and patch exposed work. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.

1.5 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Except as otherwise indicated, or as directed by the Architect, use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

- 1 Submit data for substituted products to the Architect for approval prior to use. Refer to Division 1, - PRODUCTS REQUIREMENTS.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If conditions are not as anticipated, immediately notify the Architect and secure needed directions. Do not proceed until unanticipated conditions have been resolved. Proceeding without Architect's approval and/or direction will be at the Contractor's risk.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

- 1 Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and

patching required to restore surfaces to their original condition.

- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Review proposed procedures with the original Installer; comply with the original Installer's recommendations.
- 1 In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2 To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3 Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 - 4 Comply with requirements of applicable Division 31 sections where cutting and patching requires excavating and backfilling.
 - 5 Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
- 1 Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - 2 Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 10

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SECTION 01 74 13 GENERAL CLEANING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. General Cleaning
 - 2. Safety requirements
 - 3. Progress Cleaning
 - 4. Cleaning Requirements in Specific Locations
 - 5. Final cleaning prior to Substantial Completion
- B. Related Sections include the following:
 - 1. Division 01 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
- C. Definition: General Cleaning by all Contractors, Sub-contractors and material suppliers shall be pro-actively practiced and is required to remove rubbish and debris on a frequent basis to present a worksite free of fire and safety hazards to workers, visitors and staff; remove clutter that impedes work operations; improve indoor air quality and minimize neighborhood dust propagation; manage non-hazardous construction and demolition waste; adhere to environmental statutes; minimize vermin and rodent site infestation; and encourage recycling.

103 SAFETY REQUIREMENTS

- A. Hazards Control (By each Contractor)
 - 1. Store volatile wastes in covered metal containers, and remove from the premises daily; adhere to all hazardous materials regulations
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and environmental regulations. The Contractor shall be fully responsible for any fines levied against Owner by authorities having jurisdiction over environmental compliance.

1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of chemical or liquid wastes such as, but not limited to, mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of chemical or solid wastes into streams or waterways.
4. Do not dispose of regulated and non-regulated chemical waste in solid waste dumpsters.
5. Hazardous waste must be counted toward the generator status of each contractor generating the waste and must be managed per all applicable regulations.
6. Collect and retain all concrete washout and excess solids in leak proof containers. Recycle 100% of the collected concrete washout water and solids off site. Do not bury on project site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface.
- B. Use cleaning materials only on surface recommended by cleaning material manufacturer.
- C. Rubbish Container
 1. The Contractor shall provide separate bins, storage areas and dumpster type rubbish containers with lids, sized adequately for Project waste/debris/rubbish and for various recyclable materials for the life of the Project.
 2. Dispose of container contents weekly or at more frequent intervals if required by inadequate container capacity.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

- A. General
 1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
 2. At least each week and more often if necessary, completely remove all scrap, debris and waste material from the job site to the rubbish collection location.
 3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
- B. Site
 1. Inspect site daily and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
 2. Re-stack materials stored on site weekly.
 3. At all times maintain the site in a neat and orderly condition which meets the approval of the Owner.

3.02 FINAL CLEANING PRIOR TO SUBSTANTIAL COMPLETION

- A. Each Contractor shall perform his respective final clean up and shall leave the Work of the complete Project in a clean, neat condition ready for occupancy. The following are examples, but not by way of limitation, of cleaning performance levels required. All cleaning methods and materials shall be consistent with manufacturers recommendations and approved by the Owner's Project Manager. Substantial Completion inspection shall not be scheduled until project cleaning has been accomplished to the satisfaction of the by the Owner's Project Manager. Contractor shall notify Owner in writing not less than (5) business days in advance of commencement of Final Cleaning Activities.
1. Remove labels which are not required as permanent labels
 2. Clean interior and exterior transparent materials, including mirrors and window/door glass, to a polished condition, removing substances, which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
 3. Pressure wash all building exterior walls, windows, soffits and fascia surfaces, all sidewalks and all pavement surfaces to a dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
 4. Wipe surfaces of mechanical and electrical equipment clean; remove excess lubrication and other substances; replace all varieties of filters that have been part of operating systems; clean all electrical devices and the internal wiring of all electrical panels with compressed air to remove dust.
 5. Remove debris and surface dust from limited access spaces including roofs, gutters, downspouts, drainage systems, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 6. Vacuum concrete floors in non-occupied spaces broom clean; vacuum all carpeted surfaces and similar soft surfaces and remove all stains.
 7. Clean and polish all interior floors and cove base per manufacturers' recommendations.
 8. Clean and disinfect plumbing fixtures to a sanitary condition, free of stains, including those resulting from water exposure.
 9. Clean and disinfect food service equipment to a condition, free of stains, including those resulting from water exposure. Perform full breakroom/kitchen final cleaning after all work in kitchen is completed by all Contractors.
 10. Clean light fixtures and lamps so as to function with full efficiency; replace all broken ceiling tile; clean suspended ceiling system.
 11. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Power sweep paved areas; remove stains, petrol-chemical spills, and other foreign deposits. Mow, edge, trim and rake all landscaped areas. Rake grounds which are neither planted nor paved to a smooth, even textured surface.
 12. Remove all Contractor tools, equipment, extra materials, rubbish containers, bins and vehicles.
 13. Clean and polish all casework, counters and shelving.

END OF SECTION 01 74 13

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SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 1. Salvaging nonhazardous demolition and construction waste.
 2. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Regulated Waste: A waste may be considered hazardous if it exhibits certain hazardous properties (“characteristics”) or if it is included on a specific list of wastes EPA has determined are hazardous (“listing” a waste as hazardous) because they are found to pose substantial present or potential hazards to human health or the environment.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit electronic plan within [30] days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

- A. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 - Project Management and Coordination. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of waste management.
 - 2. Review procedures for periodic waste collection and transportation to disposal facilities.
 - 3. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification for demolition and construction waste.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged or disposed.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Disposed Materials: Indicate how and where materials will be disposed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Owner/Architect; submit electronically. Provide handling, containers, storage, signage, transportation and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination and removal requirements in Section 01 50 00 - Temporary Facilities and Controls.
- B. Training: Train workers, subcontractors and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan electronically to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures & locations established for salvage & disposal.
 - 3. Copy Waste Management Training Plans to Owner/Architect for record.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways and other adjacent occupied and used facilities.
 - 1. Comply with Section 01 50 00 - Temporary Facilities and Controls for controlling dust and dirt, environmental protection and noise control.

3.2 SALVAGING DEMOLITION WASTE (IF REQUIRED)

- A. Salvaged Items for Reuse in the Work: Identify Salvage items for reuse in Project and for Owners use. Handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.

- B. Salvaged items to be reinstalled in Project shall comply with installation requirements for new materials and equipment. Provide connections, supports and miscellaneous materials necessary to make items functional for use indicated.
- C. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- D. Plumbing Fixtures: Separate by type and size.
- E. Lighting Fixtures: Separate lamps by type and protect from breakage.
- F. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panel boards, circuit breakers and other devices by type.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or otherwise reused, remove waste materials from Project site and recycle or legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Do not dispose of regulated/non-regulated chemical wastes in solid waste dumpsters.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from the site and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 – CLOSE OUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Work of this Section shall be included as a part of the Contract Documents to the Contractors on this Project
- B. Refer to the General and Supplementary Conditions of the Contract, for Substantial Completion and final payment.

1.2 SUMMARY

- A. Closeout is hereby defined to include general requirements near the end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner, and similar actions evidencing completion of the work. Specific requirements for individual parts of the Work are specified in Sections of Division 2 through 49. Time of closeout is directly associated to Date of Substantial Completion.

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION & FINAL COMPLETION

- A. Prior to requesting Architect review for Certificate of Substantial Completion, (for either entire Work or portions thereof), complete the following list.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, agreements, final certifications, and other required closeout documents.
 - 3. Obtain and submit release enabling Owner's full and unrestricted use of the work and access to services and utilities, including occupancy permits, operating certificates, and other similar required releases.
 - 4. Deliver tools, spare parts, extra stocks of materials, and similar physical items as specified to the Owner. Obtain receipts for deliveries.
 - 5. Make final changeover in security provisions.
 - 6. Complete start-up testing of systems and instruction of Owner's operating/maintenance personnel. Discontinue and remove from project site temporary facilities and service, construction tools and facilities, mock-ups, and other construction elements.
 - 7. Complete final cleaning requirements.

- B. Final Completion is to occur within 30 days of Substantial Completion after the Architect inspection to verify that the Contractor has completed the outstanding items on the first inspection punch list

1.4 PREREQUISITES OF FINAL PAYMENTS

- A. Contractor shall submit Final Payment Application within (30) days after receipt of Substantial Completion Certification.
- B. Prior to requesting Architect final review for certification of final payment, complete the following:
 - 1. Submit final payment request with required closeout attachments.
 - 2. Submit copy of Architect's final punch list of itemized Work to be completed or corrected, stating that each and every item has been completed or otherwise resolved for acceptance.
 - 3. Submit record drawing, maintenance manuals, construction progress and completion photos and similar final record information as specified.
 - 4. Submit certification of code compliance.
 - 5. Submit certification stating that no materials containing asbestos were incorporated into the Work.
 - 6. Plumbing contractor shall submit certification stating that no flux or solder used for drinking water piping containing more than 0.2 percent lead, and that no pipe or fittings uses for drinking water piping contained no more than 0.8 percent lead.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PUNCH LIST

- A. Prior to the Architect's preparation of a Project Punch list, each Contractor shall prepare his own punch list and submit to the Architect and General Contractor, for use by the Architect to facilitate completion of the Work.
- B. The Contractor's inspection shall be as thorough as possible, in accordance with his aspiration to provide first-class workmanship and maintain good reputation and shall include Work under his contract, including that of his subcontractors.
- C. The Architect shall observe the Work, providing that the Work in the Contractor's punch list has been completed, and prepare the Project Punch List for use by

Contractors and their subcontractors to expedite proper completion of the Work.

- D. The Architect will only perform two (2) punch list inspections. The Architect will do the first inspection prior to issuing the Substantial Completion certificate and will do a second inspection within 30 days of the first inspection to verify that the contractor has completed the outstanding items on the first inspection punch list. Additional inspections above and beyond as specified herein are at additional cost to the contractor and the cost of such additional inspections will be deducted from the Contract by Change Order.

3.2 WARRANTY – CORRECTION OF THE WORK

- A. Architect will check to see if additional Work by the Contractor(s) is needed to make good the warranties. An itemized list will be furnished to the Contractor for corrective or replacement work.
 - 1. At approximately one month prior to the one year warranty expiration, the Owner, Architect, and a representative of the Contractor shall visit the site and prepare the warranty punch-list.
 - 2. This Work shall be completed immediately by the Contractor(s) after receiving notification.

3.3 CLOSEOUT DOCUMENT DIGITAL SUBMITTAL

- A. Provide all required closeout documents, record, drawings, Operations & Maintenance Manuals, etc... in digital format for electronic distribution and review.
 - 1. Format shall be PDF electronic files.

3.4 PROJECT RECORD DRAWINGS

- A. Each Contractor shall keep current during the progress of the Work, and submit update Project Record Drawing at the completion of the project, especially for the purpose on this project. Drawings shall incorporate changes made in the Work of the respective trades during the Construction period. Such changes shall be indicated at the time they occur for accuracy.
- B. Maintain at the job site one copy of Drawings, Project Manual, Addenda, approved shop drawings, change orders, field orders, other Contract modifications, and other approved documents submitted by the Contractor(s), in compliance with various Sections of the Project Manual.
- C. Each of these Project Record Documents shall be clearly marked “Project Record Copy” maintained in good condition; available for observation by the Architect; and shall not be used for construction purposes. Mark up the documents to indicate the following:
 - 1. Significant changes and selections made during the construction process;

2. Significant detail not shown in the original Contract Documents including change orders;
 3. The location of underground utilities and appurtenances dimensionally referenced to permanent surface improvements;
 4. The location of internal utilities and appurtenances concealed in buildings structures, referenced to visible and accessible features of the structure;
 5. When elements are placed exactly as shown on the Drawing, so indicate; otherwise, indicate changes location.
- D. Keep Project Record Documents current. Do not permanently conceal Work until the required information has been recorded.
- E. Prior to final payment on the Project, submit to the Architect the Project Records Drawings for changes recorded for the Work of Divisions 2 through 14.
- F. Prior to final completion and payment, the Contractors for Plumbing/Mechanical Work and Electrical Work shall update their working drawings with changes made in his Work. Submit one complete set of prints of these changes working drawings to the Architect.
1. Each drawing shall be labeled "Project Record Drawing", dated and signed by the Contractor.
- G. The General Prime Contractor shall certify that the Project Record Drawings show complete and accurate as-built conditions, including without limitation, sizes, kinds of materials, vital piping and valves, conduit locations, and other similar and required items.
- H. Contractor(s) shall include as part of the Project Record Drawings, a complete and current Project Manual, indicating changes made relating to the specifications. All requirements for the Project Record Drawings apply to the Project Record Project Manual.
- I. The General Prime Contractor shall maintain all approved Permit Drawings in a manner so as to make them accessible to governmental inspectors and other authorized agencies. All approved Drawings shall be wrapped, marked, and delivered to the Owner within 10 days of the Date of Substantial Completion of the Work.

3.5 CERTIFICATION OF CODE COMPLIANCE

- A. Prior to final payment, the contractor indicated below shall submit to the Architect, letters of certification code of code compliance as follows:
1. The Subcontractor(s) for Divisions 22 23, Plumbing/Mechanical Work, shall

submit a letter of certifying that mechanical installations comply with UMC current applicable editions.

2. The Subcontractor(s) for Divisions 26, 27, and 28, Electrical Work, shall submit letters certifying that electrical wiring complies with NEC current applicable editions.
3. The Subcontractor for Division 21, Fire Suppression Work, shall submit letters certifying that alarm systems and smoke and heat detection systems comply with State of Florida Codes and Regulations, current applicable conditions.

3.6 MAINTENANCE AND OPERATING MANUALS

- A. Prior to Date of Substantial Completion, and a requirement prior to receiving final payment, each Contractor shall submit to the Architect electronic copy of a comprehensive Maintenance and Operating Manual presenting complete directions and recommendations for the proper care maintenance of visible surfaces as well as maintenance and operating instructions for equipment items which he has provided. Operation and Maintenance Manuals shall include the following:
 1. Schematic and piping and wiring diagrams.
 2. Valve charts and schedules.
 3. Lubrication charts and schedules.
 4. Guides for troubleshooting.
 5. Pertinent diagrams of equipment with main parts identification.
 6. Manufacturer's data on all equipment.
 7. Operating and maintenance instructions for all equipment.
 8. Manufacturer's part list.
 9. Any testing procedures for operating tests,
 10. Roof maintenance manual as specified in Division 07 Sections,
- B. Operating instructions shall include necessary printed directions for correct operations, adjustments, servicing, and maintenance of movable parts. Also included shall be suitable parts lists, approved shop drawings, and diagrams showing parts location and assembly.
- C. Upon Architect's approval and prior to issuance of final payment(s), each contractor shall submit corrected and completed electronic copy of Operating and Maintenance Manuals to the Architect.
- D. Finished manuals shall be titled, tabbed identifying each portion or item of the work.

- E. For each titled item or portion of the Work, manual must provide the names, addresses, and phone numbers of the following parties:
 - 1. Contractor/Installer
 - 2. Manufacturer
 - 3. Nearest dealer/supplier
 - 4. Nearest agency capable of supplying parts and service

- F. In the table of contents, indicate the following information:
 - 1. Project name and address
 - 2. Owner's name
 - 3. Name and address of Architect
 - 4. Name and address of all contractors and their contacts
 - 5. Date of submission

- G. The contractor(s) shall instruct the Owner's operating personnel in the proper use care and emergency repair of all equipment installed before final payment. The contractor(s) shall call particular attention to any safety measures that should be followed. The instruction shall be adequate to train the Owner's operating personnel in the proper use, care, and emergency repair of such equipment.

- H. Refer to Division 01, SUBMITTAL PROCEDURES for additional requirements.

3.7 CHARTS AND LOCATIONS OF CONCEALED WORK

- A. The subcontractor(s) for Plumbing/Mechanical Work shall prepare suitable charts identifying and locating each concealed control or other concealed item requiring repair, adjustment, and maintenance. Charts shall be mounted in suitable frames with glass covers secured to wall where directed.

- B. Charts shall list each item, together with its function item and location.

- C. Locations throughout the building shall be identified on the wall or ceiling by permanent, nonconstructive plates, labels, or other approved means secured in a permanent manner.

- D. Chart details, identification methods, locations, and methods of attachment shall be specified or approved by the Architect at the jobsite upon full submission of proposed procedures and proper execution of same.

END OF SECTION 01 77 00

SECTION 01 78 30 –WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
- 1 The Contractor will provide a warranty on all project work (including that added by subsequent change order after execution of the construction contract) for a period of two (2) years following the formal declaration of Substantial Completion. This two (2) year warranty will be separate from and in no way, affect other standard product/ manufacturer or workmanship warranties that extend beyond this two (2) year period for goods and services provided to this project.
 - 2 Manufacturers standard warranties are expected for this project.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.

1.2 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefitted from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- 1 Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

- E. The Owner reserves the right to refuse to accept work for the project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.3 SUBMITTALS

- A. Submit written warranties to the Architect by the date certified for Substantial Completion.
- B. When the Contract Documents require the Contractor, or the Contractor and the subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification ready for execution by the required parties.
 - 1 Refer to Division 2 through 49 for specific contract requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At final completion compile two copies of each required warranty properly executed by the Contractor, or by the Contractor, Subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the project manual.
- D. Bind warranties in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 inch by 11-inch paper. This binder is separate from the Operations and Maintenance (O&M) Manuals.
 - 1 Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
 - 2 Identify each binder on the front and the spine with the typed title "WARRANTIES", the project title or name, and the name of the Contractor.
 - 3 When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 7833

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:
 - a. Testing and inspecting agency procedures for field quality control.
 - b. Construction contraction and isolation joints.
 - c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.
3. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

- B. Field quality-control reports.
- C. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
- C. Mechanical Splice Couplers: ACI 318Type 2, same material of reinforcing bar being spliced; mechanical-lap type.
- D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain

2.4 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate one-half of dowel length, to prevent concrete bonding to one side of joint as required by details on contract documents.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 03 35 43 "Polished Concrete Finishing" for concrete floors scheduled to receive a polished concrete finish.
2. Section 32 13 13 "Concrete Paving" for concrete pavement and walks.

1.2 DEFINITIONS

- ##### A. Cementitious Materials:
- Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

- ##### B. Water/Cement Ratio (w/cm):
- The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference:

Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Special concrete finish Subcontractor.
2. Review the following:
 - a. Testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.

- h. Curing procedures.
- i. Forms and form-removal limitations.
- j. Methods for achieving specified floor and slab flatness and levelness.
- k. Floor and slab flatness and levelness measurements.
- l. Concrete repair procedures.
- m. Concrete protection.
- n. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
- o. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

- 1. Portland cement.
- 2. Fly ash.
- 3. Slag cement.
- 4. Blended hydraulic cement.
- 5. Silica fume.
- 6. Performance-based hydraulic cement
- 7. Aggregates.
- 8. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- 9. Vapor retarders.
- 10. Floor and slab treatments.
- 11. Liquid floor treatments.
- 12. Curing materials.
- 13. Joint fillers.
- 14. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

- 1. Mixture identification.
- 2. Minimum 28-day compressive strength.
- 3. Durability exposure class.
- 4. Maximum w/cm.
- 5. Calculated equilibrium unit weight, for lightweight concrete.
- 6. Slump limit.
- 7. Air content.
- 8. Nominal maximum aggregate size.
- 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
- 10. Intended placement method.
- 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:

- a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.
- D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.
- E. Research Reports:
 - 1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
 - 2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.
- F. Preconstruction Test Reports: For each mix design.
- G. Field quality-control reports.
- H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Field Quality-Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
- E. Mockups: Cast concrete slab-on-ground and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Slab-On-Ground: Build panel approximately 15 feet by 15 feet in the location indicated or, if not indicated, as directed by Architect.
 - a. Divide panel into four equal panels to demonstrate saw joint cutting.
2. Formed Surfaces: Build panel approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Architect.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 3. Do not use frozen materials or materials containing ice or snow.
 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.
5. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance

with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.

2. Maximum Coarse-Aggregate Size: As indicated on drawings.
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do 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 C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.4 FLOOR AND SLAB TREATMENTS

2.5 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.6 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 C171, polyethylene film burlap-polyethylene sheet.
1. Color:

- a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Curing Paper: 8-foot wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
- E. Water: Potable or complying with ASTM C1602/C1602M.
- F. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Floor Slab Protective Covering: 8-footwide cellulose fabric.

2.8 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.

- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash or Other Pozzolans: 25 percent by mass.
 2. Slag Cement: 50 percent by mass.
 3. Silica Fume: 10 percent by mass.
 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

2.10 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, slabs on grade and tie beams.
1. Exposure Class: ACI 318 W0 W1.
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: As indicated.
 4. Slump Limit: As indicated.

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.

3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate one-half of dowel bar length to prevent concrete bonding to one side of joint as indicated on drawings.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.

- d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

1. ACI 301 Surface Finish SF-3.0:
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/8 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class A.
 - e. Locations: Apply to concrete surfaces to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
1. Smooth-Rubbed Finish:
 - a. Perform no later than one day after form removal.
 - b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
 - c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
 - d. Maintain required patterns or variances as shown on Drawings.
 2. Grout-Cleaned Rubbed Finish:
 - a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
 - b. Do not clean concrete surfaces as Work progresses.
 - c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
 - d. Wet concrete surfaces.

- e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
 - f. Maintain required patterns or variances as shown on Drawings or to match.
3. Cork-Floated Finish:
- a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.
 - b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
 - c. Wet concrete surfaces.
 - d. Compress grout into voids by grinding surface.
 - e. In a swirling motion, finish surface with a cork float.
 - f. Maintain required patterns or variances as shown on Drawings or to match.

3.8 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 3. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.

5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
 - 2) Specified overall values of flatness, F_F 35; and of levelness, F_L 25; with minimum local values of flatness, F_F 24; and of levelness, F_L 17.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of

supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.

3. Minimum Compressive Strength: As indicated at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305.1, before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 3. If forms remain during curing period, moist cure after loosening forms.
 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.

- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Polished Finish: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- d. Floors to Receive Urethane Flooring:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- e. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- f. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.

- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than seven days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 4. Rinse with water; remove excess material until surface is dry.
 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least one month(s).
 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
 - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 3. After concrete has cured at least 14 days, correct high areas by grinding.
 - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 - 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

- b. Feather edges to match adjacent floor elevations.
 - 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 - 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
 - E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
 - F. Repair materials and installation not specified above may be used, subject to Architect's approval.
- 3.15 FIELD QUALITY CONTROL
- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
 - B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.

3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 6-inch by 12-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03 30 00

SECTION 04 22 00 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Pre-faced concrete masonry units.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Masonry-cell fill.

B. Related Requirements:

1. Section 07 62 00 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

1. Decorative CMUs, in the form of small-scale units.
2. Pre-faced CMUs.
3. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:

1. Exposed Decorative CMUs.
2. Pre-faced CMUs.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:

1. Masonry units.
 - a. Include data on material properties.
 - b. For masonry units, include data and calculations establishing average net-area compressive strength of units.
2. Integral water repellent used in CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.
7. Reinforcing bars.
8. Joint reinforcement.
9. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. **Integral Water Repellent:** Provide units made with integral water repellent for exposed units.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested in accordance with ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ACM Chemistries.
 - 2) Euclid Chemical Company (The); an RPM company.
 - 3) GCP Applied Technologies Inc.
 - 4) Master Builders Solutions.
 - 5) Moxie International.
- C. Insulated CMUs: Where indicated, units contain rigid, specially shaped, molded-polystyrene insulation units complying with ASTM C578, Type I, designed for installing in cores of masonry units.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Concrete Block Insulating Systems.
 - b. Shelter Enterprises Inc.
- D. CMUs: ASTM C90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as indicated.
 2. Density Classification: Normal weight.
 3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
- E. Decorative CMUs: ASTM C90.

1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. **York Building Products.**
2. **Unit Compressive Strength:** Provide units with minimum average net-area compressive strength as indicated.
3. **Density Classification:** Normal weight.
4. **Size (Width):** Manufactured to dimensions specified in "CMUs" Paragraph.
5. **Pattern and Texture:**
 - a. Standard pattern, ground-face finish. Match Architect's samples.
 - b. Standard pattern, split-face finish. Match Architect's samples.
6. **Colors:** As selected by Architect from manufacturer's full range.
7. **Special Aggregate:** Provide units made with aggregate matching aggregate in Architect's sample.

2.5 CONCRETE AND MASONRY LINTELS

- A. **General:** Provide one of the following:
- B. **Concrete Lintels Matching CMU in Color, Texture:** ASTM C1623, matching density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.
- C. **Precast or Formed-in-Place Concrete Lintels:** Precast or formed-in-place concrete lintels complying with requirements in Section 03 20 00 "Concrete Reinforcing," and with reinforcing bars indicated.
- D. **Masonry Lintels:** Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. **Portland Cement:** ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 1. Alkali content is not more than 0.1 percent when tested in accordance with ASTM C114.
- B. **Hydrated Lime:** ASTM C207, Type S.
- C. **Portland Cement-Lime Mix:** Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cemex S.A.B. de C.V.
 - b. Holcim (US) Inc.
 - c. Lafarge North America Inc.
 - d. Lehigh Hanson; HeidelbergCement Group.

E. Mortar Cement: ASTM C1329/C1329M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Lafarge North America Inc.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Davis Colors.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Lanxess Corporation.
 - d. Solomon Colors Inc.

G. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

H. Aggregate for Grout: ASTM C404.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. [Euclid Chemical Company \(The\); an RPM company.](#)
 - b. [GCP Applied Technologies Inc.](#)
- J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [ACM Chemistries.](#)
 - b. [Euclid Chemical Company \(The\); an RPM company.](#)
 - c. [GCP Applied Technologies Inc.](#)
 - d. [Master Builders Solutions.](#)
- K. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Heckmann Building Products, Inc.](#)
 - b. [Hohmann & Barnard, Inc.](#)
 - c. [Wire-Bond.](#)
- C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951/A951M.
1. Interior Walls: Hot-dip galvanized carbon steel.
 2. Exterior Walls: Hot-dip galvanized carbon steel.
 3. Wire Size for Side Rods: 0.148-inch diameter.
 4. Wire Size for Cross Rods: 0.148-inch diameter.
 5. Spacing of Cross Rods: Not more than 16 inches o.c.
 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

- A. General: Ties and anchors extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Mill-Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A641/A641M, Class 1 coating.
 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
- E. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.10 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
- B. Lightweight-Aggregate Fill: ASTM C331/C331M.

2.11 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime masonry cement or mortar cement mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime masonry cement or mortar cement mortar.
 4. For reinforced masonry, use portland cement-lime masonry cement or mortar cement mortar.
 5. **For exposed exterior masonry use water repellent agent.**
 6. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type N.
 3. For mortar parge coats, use Type S or Type N.
 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 3000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.

4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.

3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Wet joint surfaces thoroughly before applying mortar.
 3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-CELL FILL INSTALLATION

- A. Pour loose-fill insulation into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.
- B. Where required, install molded-polystyrene insulation units into masonry unit cells before laying units.

3.7 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as indicated on drawings.

3.10 LINTELS

- A. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.11 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
 - 4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.12 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level B in TMS 402/ACI 530/ASCE 5.
 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content.
- H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.
- I. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at 7 days and at 28 days.

3.14 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Crush masonry waste to less than 4 inches in each dimension.
 - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 20 00 "Earth Moving."
 - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 22 00

SECTION 04 42 20 – MARBLE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes marble window sills and interior door thresholds.

1.2 SUBMITTALS

- A. Samples: 12 inch section of marble showing the full range of variations in appearance characteristics to be expected in completed work.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.
 - 1. Do not use pinch or wrecking bars.
 - 2. Store stone on wood skids or pallets covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.
 - 3. Protect stored stone from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around stones.
 - 4. Store cementitious materials off the ground, under cover, and in dry location.

PART 2 - PRODUCTS

2.1 MARBLE

- A. White Cherokee by the Georgia Marble Company, Dimension Stone Group

- B. Physical Properties: per ASTM C503:

1.	Absorption by weight, %	0.09
2.	Density, lb/cu.ft.	169
3.	Compressive strength, PSI	9333
4.	Modulus of rupture, PSI	1364
5.	Abrasion resistance, hardness	16.6
6.	Flexural strength, PSI	1296

2.2 FABRICATION

- A. Fabricate dimension stonework in sizes and shapes required, including Drawing details and final Shop Drawings.
 - 1. Comply with recommendations of Marble Institute of America, Inc. (MIA) as published in "Dimensional Stone - Design Manual III."

- B. Finish exposed faces and edges of stones to comply with requirements indicated for finish under each type and application of stone required and to match approved samples.
- C. Inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material, and fabrication; replace defective stones with ones that do comply.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Examine surfaces to receive marble, and conditions under which marble will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. All materials used in installation of marble shall be in accordance with the manufacturer's requirements.
- C. Clean surfaces to remove dirt, stains, or other defacements. Do not use wire brushes, harsh abrasive cleansers or acid.

3.2 PROTECTION

- A. Protect and maintain conditions to ensure stonework is not damaged at time of Substantial Completion.

END OF SECTION 04 42 20

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following metal fabrications:

1. Rough hardware
2. Ladders (including elevator pit ladders)
3. Loose bearing and leveling plates
4. Miscellaneous framing and supports.
5. Steel pipe bollards
6. Concrete filled steel pan stair nosing.

- B. Total weight of steel used in metal fabrications shall contain a minimum of 10% combined post-industrial and post-consumer recycled content.

1.3 SUBMITTALS

- A. Product data for non-slip aggregates and non-slip aggregate surface finishes, extruded nosings and treads, paint products, and grout.
- B. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Samples representative of materials and finished products as may be requested by Architect.
- D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.
- C. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
1. See Concrete and Masonry Sections of these Specifications for installation of inserts and anchorage devices.
- D. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Steel Plates, Shapes, and Bars: ASTM A36.
- C. Rolled Steel Floor Plates: ASTM A786.
- D. Steel Tubing: Product type (manufacturing method) and as follows:
1. Cold-Formed Steel Tubing: ASTM A500, Grade B.
 2. Hot-Formed Steel Tubing: ASTM A501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A53.
- E. Steel Pipe: ASTM A53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.

1. Black finish, unless otherwise indicated.
2. Galvanized finish for exterior installations and where indicated.

F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A27 cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A153.

G. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

H. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153.

2.2 PAINT

A. Shop Primer for Ferrous Metal:

1. Exterior exposed steel scheduled to be painted if not galvanized: Tnemec Tneme-Zinc 90-97 or equal by Carboline or Ameron.
2. Refer to Section 09 91 00, Painting, for primer for interior exposed steel scheduled to be painted.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

D. Coordinate standard shop primers normally provided with the finish paint specifications for these items. Painting. Metal fabricator will be required to provide the primers as specified in Section 09 91 00, no exceptions. All items scheduled to receive finish coats shall be prepared for primer in accordance with SSPC - SP 6, Commercial Blast Cleaning, or SSPC - SP3, Power Tool Cleaning, as recommended by the manufacturer for the types of primers installed.

2.3 FASTENERS

A. Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electro-deposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.

- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).
- E. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).
- F. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Provide galvanized anchors at exterior locations.

2.4 GROUT

- A. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Products: Subject to compliance with requirements, provide one of the following:
 - 1. B-6 Construction Grout; W. R. Bonsal Co.
 - 2. Sure-grip High Performance Grout; Dayton Superior Corp.
 - 3. Euco N-S Grout; Euclid Chemical Co.
 - 4. Sealtight 588 Grout; W. R. Meadows, Inc.

2.5 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements of Section 03 30 00, Cast-in-Place Concrete, for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless higher strengths are indicated.

2.6 FABRICATION

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 degrees F.
- D. Shear and punch metals cleanly and accurately. Remove burrs.
 - E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - F. Remove sharp or rough areas on exposed traffic surfaces.
 - G. 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 that no roughness shows after finishing, and contour of welded surface matches those adjacent.
 - H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
 - I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - J. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for re-assembly and coordinated installation.
 - K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
 - L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- 2.7 MISCELLANEOUS METAL FABRICATIONS
- A. Rough Hardware
 1. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 06 Sections.
 2. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

B. Steel Ladders

1. Manufacturer Basis of Design:
 - a. Bilco: BL-A WG 4 Fixed Aluminum Ladder w Guardrail and Bilco E-50 36 x 36 Aluminum Hatch (or approved equal)
2. Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3.
3. Siderails: Continuous, steel, 1/2-by-2-1/2-inch flat bars or bent plate, with eased edges, spaced 18 inches apart.
4. Bar Rungs: 3/4-inch- diameter steel bars, spaced 12 inches o.c.
5. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
6. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. with welded or bolted steel brackets.
 - a. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
 - b. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
7. Provide non-slip surfaces on top of each rung, either by coating the rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a type of manufactured rung that is filled with aluminum-oxide grout.
8. Galvanize ladders, including brackets and fasteners, in the following locations:
 - a. Exterior locations.
 - b. Interior locations, where indicated.

C. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

D. Miscellaneous Framing and Supports

1. Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
2. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - a. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - b. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4-inch-thick by 8 inches long.

E. Miscellaneous Steel Trim

1. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
2. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
3. Galvanize miscellaneous steel trim in the following locations:
 - a. Exterior locations.

F. Finishes, General

1. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
2. Finish metal fabrications after assembly.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Steel Pipe Bollards

1. Fabricate pipe bollards from Schedule 80 steel pipe. Fill bollards with concrete. Provide a rounded top.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Installer must examine the areas and conditions under which miscellaneous and ornamental items are to be installed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.3 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- 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 that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.4 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use non-shrink, metallic grout in concealed locations where not exposed to moisture; use non-shrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Install with anchorage system indicated to comply with manufacturer's recommendations.
- B. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 07 Section "Joint Sealants" to provide a watertight installation.

3.6 STEEL LADDERS

- A. Ladder to be attached directly to floor and wall. Do not attach to roof surfaces.

3.7 INSTALLING PIPE BOLLARDS

- A. Anchor bollards in concrete as indicated on the Drawings.
- B. Fill bollards solidly with concrete, mounding top surface.
- C. Paint safety yellow.

3.8 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0-mil minimum dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 09 91 00 Section "Painting."
- C. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION 05 50 00

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SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Exterior wood grounds, blocking, and sleepers
 - 2. Plywood Backer Panels

1.2 REFERENCES

- A. Lumber Standard: Comply with PS-20 and with applicable rules of the respective grading and inspecting agencies for species and products indicated.
- B. Plywood Product Standards: Comply with PS 1 (ANSI A199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard PRP-108 for type of panel indicated.

1.3 DEFINITIONS

- A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
 - 1. For pressure treated lumber and plywood, place spacers between each bundle to provide air circulation.

PART 2 – PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: SPIB - Southern Pine Inspection Bureau.
- C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide seasoned lumber with 19 percent maximum moisture content at time of

dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

3. "Standard" grade.
4. Southern Pine graded under SPIB rules.

2.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. No. 2 Boards per SPIB rules.
- D. Wood grounds, nailers, and sleepers shall be pressure treated as specified.

2.3 PLYWOOD PANELS

- A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.
- B. Trademark: Furnish construction panels that are each factory-marked with APA trademark evidencing compliance with grade requirements.
- C. Electrical or Telephone Equipment Backing Panels: DOC PS-1, Exposure 1 CD Plugged, fire retardant treated, Thickness: Minimum 15/32 inch. Paint per Division 09.

2.4 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. All fasteners used in conjunction with pressure treated (ACO or CDDC) wood shall be G185 hot dipped galvanized or stainless steel.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Coordinate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Use screws, unless otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.

Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

- E. Apply field treatment complying with AWP M4 to cut surfaces of preservative- treated lumber and plywood.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Install permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.3 INSTALLATION OF EQUIPMENT BACKER BOARDS

- A. Install 3/4 inch panels mounted to pressure treated 2 by 4, providing a 3 1/2 inch space behind panel for wiring.

END OF SECTION 06 10 00

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SECTION 06 20 23 – INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The extent of each type of finish carpentry is shown on the Drawings and in schedules.
- B. "Finish Carpentry" is defined to include (in addition to items so designated on the Drawings or in these Specifications) miscellaneous exposed wood members commonly known as Architectural Woodwork or Millwork, unless such items are specified under another Section of these Specifications.
- C. All wood shall be FSC certified.
- D. All particle board shall be formaldehyde-free.

1.3 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Submit copies of product data for each type of factory-fabricated product and process specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.
- C. Submit samples for verification purposes of the Plastic Laminate
- D. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - a. Provide manufacturer's statement indicating the location where the base materials were manufactured.
 - 2.. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. – Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.
 - b. – Confirm that each product contains no urea formaldehyde.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Arrange for installation of finish carpentry by a firm that can demonstrate successful experience in installing finish carpentry items similar in type and quality to those required for this Project.
- B. Quality Standards: Except as otherwise shown or specified, comply with specified provisions of

the Architectural Woodwork Institute (AWI) "Quality Standards."

- C. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain verify dimensions and any shop drawing details as required for accurate fit.
- D. Optimum Moisture Content: Kiln-dry woodwork to an average moisture content of 6 to 11 percent or as otherwise recommended by applicable Quality Standards for the regional climatic conditions involved.
- E. Ensure all preservative is adequately fixed in wood. Reject lumber with surface residues of white salts. Provide wood that is kiln-dried after treatment or pre-finished with a sealer.
- F. No products used within the interior of the building shall contain urea formaldehyde glue.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
- B. Do not deliver interior finish carpentry until environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified for installation areas.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Obtain and comply with finish carpentry manufacturer and installer's coordinated advice for optimum temperature and humidity conditions for finish carpentry during its storage and installation.
- B. Do not install woodwork until the required temperature and relative humidity have been stabilized in installation areas.
- C. Maintain temperature and humidity conditions until acceptance of the Work by the Owner.

PART 2 - PRODUCTS

2.1 GRADING

- A. Lumber Grades: Shall be as specified herein and shall conform to requirements of AWI Section 100 for species specified.

2.2 MATERIALS

- A. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" for lumber and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- B. Plywood Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood and, for products not manufactured under PS 1, with APA PRP-108.

- C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, and moisture content at time of surfacing, and mill.
 - 1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

- D. Formaldehyde Emission Levels: Comply with formaldehyde emission requirements of each voluntary standard referenced below:
 - 1. Particleboard: NPA 8.
 - 2. Medium-Density Fiberboard: NPA 9.
 - 3. Hardwood Plywood: HPMA

- F. Core Materials
 - 1. Formaldehyde-Free Particleboard: Provide Premium Industrial Grade, conforming to the Commercial Standards CS-236-66 Type 1, Density B, Class 2, Property Requirements, (CS 1B2), also known as ANSI A208.1 latest edition.

 - 2. Hardwood and Hardwood Plywood
 - a. Solid lumber or plywood concealed members; solid wood to be hardwood, kiln dried, select Poplar, Fir, or mill option lumber and plywood shall be Baltic Birch 7- ply, cabinet grade.
 - b. Countertops in wet areas: Marine grade plywood.

- F. Shelving:
 - 1. One inch formaldehyde-free particleboard shelves.
 - 2. Exposed Locations: Vertical grade plastic laminate both sides. Color to match cabinet exterior plastic laminate or as selected by Architect.
 - 3. Semi-exposed locations: Vertical grade plastic laminate or melamine.
 - 4. Front and back leading edges shall be edged with flat 1mm thick high impact PVC edging to match shelf color.

2.3 INTERIOR STANDING AND RUNNING TRIM

- A. Trim and Rails: Provide lumber complying with the following requirements.
 - 1. Species and Appearance: Northern Hard Maple, free from defects and selected for compatible grain and color.
 - 2. Lumber for Transparent Finish, Stained: Solid lumber stock.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
 - 1. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.

 - 2. Where finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A153.

- B. Adhesives: Comply with manufacturer's recommendations for adhesives.
- C. High Pressure Plastic Laminate (for adjustable shelves, lavatory tops, ETC...):
 - 1. Plastic laminate except backing or balancing sheets shall be high pressure laminate conforming to NEMA LD 3.
 - 2. Shall be Wilsonart "Design Group I" series or Architect approved equivalent; colors shall be selected by the Architect from the full line of standard colors.
 - 3. Exposed Horizontal Surfaces: Shall be nominal .050-inch-thick minimum with textured finish and conforming to NEMA standards for GP50 horizontal grade.
 - 4. Exposed and Semi-Exposed, Interior and Exterior Vertical Surfaces: Shall be .028-inch-thick minimum with low luster textured finish and conforming to NEMA standards for GP28 vertical grade.
 - 5. Backing Sheet for Concealed Surfaces: Shall be .030 or .020 inches thick, conforming to NEMA standards for GP28 vertical grade or CL20 cabinet liner.
 - 6. Backing Sheet for Semi-Exposed Surfaces: Shall be .028 inches thick, conforming to NEMA standards for GP28 vertical grade. Use to balance face of laminate.

2.5 FABRICATION

- A. Wood Moisture Content: Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of finish carpentry in relation to relative humidity conditions existing during time of fabrication and in installation areas. Provide finish carpentry with moisture content that is compatible with Project requirements.
- B. Fabricate finish carpentry to dimensions, profiles and details indicated. Ease edges to radius indicated for the following:
 - 1. Lumber less than 1 inch in nominal thickness: 1/16 inch.
 - 2. Lumber 1 inch or more in nominal thickness: 1/8 inch.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected.
- B. Inspect materials or equipment immediately upon delivery and again prior to installation. Do not use finish carpentry materials that are unsound, warped, bowed, twisted, improperly treated or finished, not adequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- C. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
 - 1. Scribe and cut finish carpentry to fit adjoining Work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Install to tolerance of 1/8 inch in 8 feet for plumb and level. Install adjoining finish carpentry with 1/16-inch maximum offset for flush installation and 1/8-inch maximum offset for reveal installation.
 - 3. Coordinate finish carpentry with materials and systems that may be in or adjacent to standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.

4. Use finishing nails for finish Work. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- D. Recheck measurements and dimensions, before starting each installation.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Refer to Division 09 Sections for final finishing of finish carpentry.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation for a minimum of 24 hours unless longer conditioning recommended by manufacturer.

3.3 ADJUSTING

- A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

3.4 CLEANING

- A. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 20 23

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SECTION 07 11 13 – BITUMINOUS DAMPROOFING

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 hot-applied and cold-applied, emulsified- asphalt damproofing applied to the following surfaces:
 - 1. Exterior, below-grade surfaces of concrete and masonry foundation walls.
 - 2. Exterior face of concrete tilt walls under metal wall panels.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.
- B. Material Certificates: For each product, signed by manufacturers.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain primary damproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt damproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of damproofing in enclosed spaces. Maintain ventilation until damproofing has thoroughly cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Hot-Applied Asphalt Damproofing:
 - a. Meadows, W. R., Inc.
 - b. Owens Corning; Trumbull Division.
 - 2. Cold-Applied, Emulsified-Asphalt Damproofing:
 - a. The Euclid Chemical Company
 - b. Henry Company.
 - c. Meadows, W. R., Inc.

- d. Sonneborn, Div. of ChemRex, Inc.
- 3. Protection Course, Asphalt-Board Type:
 - a. Grace, W. R. & Co.; Construction Products Div.
 - b. Meadows, W. R., Inc.
 - c. Sonneborn, Div. of ChemRex, Inc.

2.2 BITUMINOUS DAMPPROOFING

- A. Odor Elimination: For interior and concealed-in-wall uses other than exterior face of inner wythe of cavity walls, provide dampproofing material warranted by manufacturer to be substantially odor free after drying for 24 hours under normal conditions.
- B. Hot-Applied Asphalt Dampproofing: ASTM D 449, Type I.
- C. Cold-Applied, Emulsified-Asphalt Dampproofing:
 - 1. Trowel Coats: ASTM D 1227, Type II, Class 1.
 - 2. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
 - 3. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 MISCELLANEOUS MATERIALS

- A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
- B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- C. Protection Course, Asphalt-Board Type: Pre-molded, 1/8-inch- thick, multi-ply, semi-rigid board consisting of a mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, and faced on 1 side with polyethylene film.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
 - 1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written recommendations unless more stringent requirements are

indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.
 2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
- B. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior whether indicated or not.
1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
 2. Extend 12 inches into intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat required for embedding fabric is in addition to other coats required.
- C. Apply dampproofing to provide continuous plane of protection on exterior face of exterior masonry walls under lath and stucco.
1. Lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
 2. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe, and lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.
- D. Provide hot-applied, emulsified- asphalt dampproofing, as specified in subsequent articles for substrates indicated, within the following limitations:
1. Use hot-applied asphalt dampproofing only on exterior, below-grade surfaces or earth-covered areas of building and at elevator pit walls.

3.4 HOT-APPLIED ASPHALT DAMPPROOFING

- A. Do not apply hot asphalt when substrate condition causes foaming.
- B. Prime masonry and other porous substrates.
- C. Apply a uniform coat of hot asphalt by mopping or spraying at not less than 20 lb or 2.5 gal./100 sq. ft.
- D. Apply a second coat to below-grade foundation walls as specified above. Apply double thickness of second coat where first application has failed to produce a smooth, shiny, impervious coat.

3.5 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Under metal wall panels, on exterior face of exterior concrete tilt walls: Apply primer and one brush or spray coat at not less than 5 gal/100 sq. ft. to produce a uniform, dry film thickness of not less than 30 mils.

3.6 INSTALLATION OF PROTECTION COURSE

- A. Install protection course over completed-and-cured dampproofing at below grade dampproofing only. Comply with dampproofing material manufacturer's written

recommendations for attaching protection course. Support protection course with spot application of trowel-grade mastic where not otherwise indicated.

3.7 CLEANING

- A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 07113

SECTION 07 21 00 – THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following types of insulation:

1. Miscellaneous stuffing insulation.
2. Unfaced batt insulation.
3. Sound attenuation blankets.
4. Polyisocyanurate insulation board
5. Foam Insulation for CMU cells

- B. All fiberglass insulations shall be formaldehyde-free.

1.3 SUBMITTALS

- A. Submit complete product data for each material proposed to be provided.
- B. Submit complete manufacturers installation instructions for each type of insulation as specified.
- C. Submit manufacturer's certificate certifying that insulation meets or exceeds specified requirements.
- D. Submittal Requirements:
 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.4 QUALITY ASSURANCE

- A. Insulation shall be legibly marked with the following data:
 1. Its "R" value per inch and the mean test temperature
 2. The manufacturer's name
 3. The insulation type and its trade name
 4. Water vapor transmission (perm inch average)
 5. UL rating - flame spread, fuel contribution, smoke developed, ASTM E84.
- B. The "R" values indicated are for the insulation tested at 75 degrees F mean temperature. It shall be for the total thickness of the insulation and shall exclude surface resistance. Manufacturers

shall certify that their insulation complies with these requirements.

- C. Insulation delivered to the job without this identification or being less efficient than the insulation specified will be rejected.
- D. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, 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 materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS STUFFING INSULATION

- A. Shall be inorganic (non-asbestos) mineral wool insulation without facing, for the purpose of filling and stuffing openings in walls around pipes, structural components, conduits, expansion joints to eliminate noise transfer and to insulate. Use to seal top of interior walls, not fire rated walls, between masonry and roof deck, or as otherwise indicated. Use at expansion joints as detailed or as otherwise indicated. Insulation shall have a flame spread rating of 15 or less, and a smoke development rating of 0; per ASTM E84. Miscellaneous stuffing insulation shall be formaldehyde-free. Approved manufacturers are as follows:
 - 1. Thermafiber Corporation, Wabash, Indiana
 - 2. Rock Wool Manufacturing Company, Leeds

2.2 UNFACED BATT INSULATION

- A. Unfaced preformed glass fiber batt insulation conforming to ASTM C665, Type I. Flame spread shall be 25, smoke developed 50 in accordance with ASTM E136. Unfaced batt insulation shall be formaldehyde-free. Approved manufacturers are as follows:
 - 1. Owens-Corning Fiberglas Corp.
 - 2. CertainTeed Corporation
 - 3. JohnsManville

2.3 SOUND ATTENUATION BLANKETS

- A. Sound attenuation blankets shall be unfaced glass fiber insulation conforming to ASTM C665, Type I. Blankets shall be held in place by clips as recommended by the manufacturer. Flame spread shall be 25, smoke developed 50 in accordance with ASTM E136. Sound attenuation blankets shall be formaldehyde-free. Approved manufacturers are as follows:
 - 1. Owens-Corning Fiberglas Corp.
 - 2. CertainTeed Corporation

3. Johns Manville

2.4 POLYISOCYANURATE INSULATION BOARD

- A. Polyisocyanurate Insulation Board: shall conform to ASTM C1289, Type II, Class1 and provide a minimum Long Term Thermal Resistance (LTTR) value of 6.0 per inch (the basis for establishing thickness).
- B. Fire Resistant Rating: ASTM E-119. Minimum 25 psi compressive strength. Thickness to provide minimum R-5.7 value.
 1. Celotex Co.
 2. GAF
 3. John's Manville

2.5 FOAMED IN PLACE CONCRETE MASONRY UNIT CELL WALL INSULATION

- A. Foamed In Place Insulation shall conform to the following: Noncombustible, Class A building material Maximum flame spread, smoke developed and fuel contributed of 0, 5 and 0 respectively. "R" Value of 4.91/inch @ 32 degrees F mean; ASTM C-177. Transmission Class ("STC") rating of 53 and a minimum Outdoor Indoor Transmission Class ("OITC") rating of 44 for 8" wall assembly (ASTM E90-90).
 1. Core-Fill 500, Tailored Chemical Products, Inc.
 2. Equivalent product as approved by Architect.

2.6 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare surfaces and areas to receive insulation material as required by the manufacturer. Do not install materials in unsatisfactory areas or to improperly prepared surfaces.

3.2 GENERAL INSTALLATION

- A. Coordinate application of insulation with the appropriate building trades involved.
- B. The installer doing the insulation work shall furnish adhesives or attaching means, if required, so that insulation material will be properly held in alignment and permanently attached to the surfaces which they are to be applied without damaging surface.
- C. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.3 MINERAL WOOL INSULATION

- A. Where the Drawings call for interior walls to extend to deck or roof, openings in walls between rooms above the ceiling shall be sealed with mineral wool placed or stuffed in openings to eliminate noise transfer and air movement. Mineral wool insulation shall be provided at other building locations indicated or requiring minor fill to eliminate air movement.
- B. All voids in the perimeter of the building shell shall be filled and closed with batt insulation or miscellaneous mineral wool stuffing insulation, whether or not indicated or shown. This includes behind all steel beams, wide flange beams, channels, CMU, miscellaneous framing, edge of roof deck to parapet walls, etc. If exposed to return air plenums or any type of plenum or ceiling space above lay-in and gypsum board ceilings, product shall be Class A rated and use mineral wool stuffing insulation. Coordinate with all trades.

3.4 BATT INSULATIONS

- A. Install in areas as indicated. Install in strict accordance with the manufacturers written installation instructions. Install in all exterior wall voids, behind beams, and concealed locations in the exterior walls and roof areas of the building whether or not indicated. All gaps shall be filled with batt insulation.
- B. Install thermal insulation as follows:
 - 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
 - 4. Until gypsum board is installed, hold insulation in place with 10-inch staples fabricated from 0.0625-inch (16-gage)-diameter tie wire and inserted through slot in web of member.
- C. All voids in the perimeter of the building shell shall be filled and closed with batt insulation or miscellaneous mineral wool stuffing insulation, whether or not indicated or shown. This includes behind all steel beams, wide flange beams, channels, CMU, miscellaneous framing, edge of roof deck to parapet walls, etc. If exposed to return air plenums or any type of plenum or ceiling space above lay-in and gypsum board ceilings, product shall be Class A rated and use mineral wool stuffing insulation. Coordinate with all trades.

3.5 SOUND ATTENUATION BLANKETS

- A. Install in interior walls where indicated. Install with clips as recommended by the manufacturer. Install in strict accordance with the manufacturers written installation instructions. Install from floor to full height of wall, or as otherwise indicated.

3.6 RIGID BOARD INSULATION

- A. Install board insulation on concrete substrates by adhesively attached, spindle- type insulation anchors Fasten anchors to concrete substrates with adhesive according to anchor manufacturer's written instructions.

3.7 FOAMED IN PLACE CONCRETE MASONRY UNIT CELL WALL INSULATION

Fill all open cells and voids in hollow concrete masonry walls where shown on drawings. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" holes drilled into every vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface

3.8 GENERAL INSTALLATION PROVISIONS

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Recheck measurements and dimensions, before starting each installation.
- F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

END OF SECTION 07 21 00

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SECTION 07 41 13 – STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Preformed metal roofing and related Work as specified herein, and as required for a complete and watertight installation. Work under this Section includes, but is not limited to:
 - 1. Metal roofing and fascia
 - 2. Flashing, closures, and cap trim
 - 3. Metal gutters and downspouts
 - 4. Vent roof jacks and mechanical curbs

1.3 SUBMITTALS

- A. Shop Drawings: Show profile and gage of items, location and type of fasteners; location, gage, shape, and method of attachment of trim; and other details as may be required for a weathertight installation.
 - 1. Do not proceed with manufacture prior to review of shop drawings. Do not use Drawings prepared by Architect for shop or erection drawings.
 - 2. Shop drawings shall show methods of erection, elevations, and plans of roof panels, sections, and details, anticipated loads, flashings, gutters, downspouts, roof curbs, vents, sealants, interfaces with materials not supplied, and proposed identification of components parts and their finishes.
 - 3. Shop Drawings shall bear the seal and signature of Structural Engineer registered in the State of Florida.
 - 4. Calculations for wind load design shall be stamped, sealed and signed by a Professional Engineer in the State of Florida verifying compliance with ASCE/SEI 7-02.
 - 5. Submit laboratory test report showing roof assembly compliance with SSTD 12-99.
- B. Submit current Miami-Dade NOA for metal roof panel system and Florida Product Approval.
- C. Submit 3 samples of proposed finish materials.
- D. Submit pre-roofing conference meeting minutes.
- E. Submit warranties as specified herein.
- F. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.

- a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.4 QUALITY ASSURANCE

- A. Applicable standards:
 1. AISC: "Steel Construction Manual," American Institute of Steel Construction.
 2. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute.
 3. ASTM A792: Specifications for steel sheet, aluminum-zinc alloy coated (galvanized) by the hot dip process, general requirements (galvalume).
 4. ASTM E283: "Air Infiltration Test."
 5. ASTM E331: "Water Penetration Test."
 6. ASTM A653: Specifications for steel sheet, hot dipped galvanized steel, coated aluminum-zinc alloy, coated steel-hot dipped aluminum zinc alloy or painted galvanized with exterior color specified by manufacturer.
- B. Manufacturer's qualifications: Manufacturer shall have a minimum of 15 years' experience in manufacturing panels of this nature, in a permanent, stationary, indoor production facility.
- C. The installer shall have been actively installing the type of roofing system defined in these Specifications for a minimum of 5 years and be approved by the manufacturer of the system being installed.
- D. Design: The preformed metal roof system shall be designed to sustain the specified loads in accordance with governing building codes in the county and state that this Project is located in. Components of the preformed metal roof system shall meet the design loads and applied in load combinations as specified in governing building codes, without exceeding the allowable working stresses.
 1. Roof system shall be designed to meet 150 mph wind-loading requirements for Risk Category IV per the 2014 Florida Building Code.
- E. When tested in accordance with ASTM E 1680 and ASTM E 1646, the panel assembly shall show no more than 0.01 cfm/ft² of air infiltration at 6.24 psf test pressure and no water leakage at 12 psf test pressure for 15 minutes with a volume spray of 5 gallons per hour.
- F. Structural: Uniform load capacity shall be determined by testing in accord with the principles of ASTM E 1592 adapted to testing of formed sheet panels by clarifying specific sections of this standard as follows:
 1. Roof test specimens shall be representative of the main body of the roof, free from influence of perimeter conditions. The setup shall be continuous over one or more supports and contain at least 5 panel widths.
 2. No roof attachments are permitted at the sides other than the standard gable or rake condition. For uplift tests, at least one end seal shall be flexible and in no way restrain the crosswise distortion of panels. One end may simulate an eave condition if at least 12 feet away from the mid-roof clip under evaluation.
 3. Roofing panels and accessories shall be production material of the same type and thickness proposed for use on the project.
 4. Longitudinal seals or plastic film shall not span any crevice or cracks that may tend to separate under pressure (e.g. plastic films used to seal the chamber must be applied

into the side seam of the panel so as to apply a uniform static pressure to the entire cross section of the panel).

5. Design capacity for conditions of gage, span or loading other than those tested may be determined by the interpolation of test results in accord with the AISI Cold Formed Steel Manual. Extrapolation outside the range of the tests is not acceptable.
- G. Weathertightness: When tested in accord with the principles of NAAMM TM-1, the roof system without sealant in the ribs shall show no leakage when exposed to dynamic rain and wind velocity up to 70 mph for 5 minutes.
- H. Thermal Cycle Test: An assembly consisting of clips, 3 or more panels in width, and spanning 3 or more supports with clips positively loaded to 10 pounds shall resist 100,000 thermal cycles and show no visible signs of wear from the exterior and erode no more than 25 percent of the panel of clip material from the underside (non-exposed surfaces).

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver panels to job site properly packaged to provide against transportation damage.
- B. Handling: Exercise extreme care in unloading, storing, and erecting panels to prevent banding, warping, twisting, and surface damage.
- C. Storage: Store materials and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation to panels to prevent condensation build-up between panels.

1.6 JOB CONDITIONS

- A. Pre-Roofing Conference
 1. Prior to the installation of the roofing and associated work, meet at the project site with the installer, the installer of each component of associated work, the installers of deck or substrate construction to receive roofing work, the installers of other work in and around roofing that must follow the roofing work (including Mechanical Work), the Architect, and other representatives directly concerned with performance of the work, including (where applicable) insurers, test agencies, product manufacturers, governing authorities, and the Owner. The Contractor shall record the discussions of the conference and the decisions and agreements reached and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the roofing work including, but not necessarily limited to, the following:
 - a. Review project requirements (Drawings, Specifications, and other Contract Documents).
 - b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrate work (not by the Metal Roofing Installer), including drying, structural loading limitations, and similar considerations.
 - d. Review required inspection, testing, certifying, and accounting procedures.
 - e. Review regulations concerning code compliance, environmental protection, health, safety, fire, and similar considerations.

1.7 WARRANTY

- A. The roofing contractor and construction manager each shall furnish a written guarantee covering

the roofing and flashing work including the installation of products in the system, against defects in materials and workmanship for a period of 2 years. Guarantees are not intended to serve as protection against poor workmanship or inferior or improper materials at the time the roof is installed, but are for the purpose of protecting the Owner against future failures during the intended life of the roof covering.

- B. The manufacturer for the preformed metal roofing shall also furnish to the Owner a written guarantee covering the finish of coated metal surfaces against blistering, peeling, cracking, flaking, checking, chipping, rusting, and excessive chalking and color change for a period of 20 years.
 - 1. Also provide a manufacturer's 20 year weathertightness warranty equal to Industry Standard weathertightness warranty.
- C. Guarantee/warranty shall include, but not be limited to, preformed metal roofing, fascias, roof insulations, flashings, cap flashings, closures and trims, fasteners, accessories, sealants, including gutters and watertight connection to downspouts.
- D. Guarantee/warranty period shall begin on the Date of Substantial Completion for the Project or such date that the roof is accepted by the Architect and Owner.
- E. Repairs required, either permanent or temporary, to preformed metal roofing or roof flashings under this guarantee to keep the roof watertight shall be started within 3 days after notice of the need for repairs. Should the Contractor fail to make such repairs within a reasonable time period, the Owner may have such repairs made and charge the cost to the Contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Preformed metal roofing shall be minimum 2 inches high, vertical leg field crimped, standing seam panels with concealed fasteners.
- B. Products of the following manufacturers will be considered, providing their products equal or exceed the quality specified; and they can provide products of the type, size, function, and arrangement required.
 - 1. Basis of Design: Berridge "Cee-Lock" or as determined by the Owner.
 - 2. MBCI, Inc.
 - 3. Metal Sales Manufacturing Corp.,
- C. Finish to be factory applied one mil thick full strength Kynar fluorocarbon based coating over thoroughly cleaned and pretreated galvanized coated steel in single color as selected by the Architect. Coating to be applied before fabrication of roofing components.
- D. Metal sheets or coils selected for forming into panels must be cut to size before receipt of finish coating or have cut edges specially coated with similar film of same applied finish after being sized. Actual finish and coating method intended for provision must appear on submitted shop drawings.
- E. Panels must be shop fabricated. Field formed panels are not acceptable.

2.2 DESIGN OF SYSTEM

- A. Panel shall be designed in accordance with sound engineering methods and practices and in

accordance with the latest edition of AISI's "Specification for the Design of Cold Formed Steel Structural Members."

- B. Roof structure shall be designed with proper recognition for the "floating system" which must exist to have a roof panel that meets expansion and contraction requirements.
- C. Panel shall be designed so that damaged panels may be replaced without interfering with adjacent panels. Replacement shall not require the use of through the roof fasteners.

2.3 MATERIALS

- A. Panels shall be fabricated in full lengths from ridge to eave without end laps. Panels shall be 16 inches wide maximum with concealed anchors that resist wind uplift yet permit expansion and contraction with temperature changes. Standing ribs 2 inches high minimum shall have a continuous groove capillary break. Ribs shall be securely locked over anchor clips with an electrically driven, field operated, roll forming tool. Individual panels shall be removable for replacement of damaged material. A minimum of two, 3/8-inch high intermediate stiffener ribs shall be located in the flat pan to minimize oil-canning and telegraphing of structural members, striated panels are also acceptable. Panels shall be Galvalume "Plus" prefinished 50 ksi steel per ASTM A792.
 - 1. 24 gauge Galvalume panels finished with full strength Kynar 500 coating.
 - 2. Galvalume sheet shall be produced in accordance with ASTM A792 with coating designation of AZ55.
 - 3. Provide regular spangle surface without chemical treatment.
 - 4. Oil coating shall be kept at a minimum. Clean panels of all oil prior to shipment.
 - 5. Use clean, dry gloves during handling and installation.
 - 6. Care shall be exercised to prevent the roofing panels from sliding over each other during shipment and installation.
- B. Clip angle "bearing plate" shall be a minimum of 18 gauge 36,000 psi G90 hot dip galvanized steel. The concealed backing plate shall have recessed pre-punched holes for deck attachment.
- C. Concealed clips shall be not less than 24 gauge galvanized coated, 50,000 psi minimum yield or nonmagnetic stainless steel. Clip design is to be such that it will accommodate expansion and contraction requirements while being anchored securely to structure.
- D. Concealed fasteners shall be self-drilling, self-tapping sheet metal screws of SAE #1022 steel with .0003-inch minimum zinc coating meeting Federal Specification QQ-Z325 Type II.
- E. Exposed fasteners shall be self-tapping, stainless steel sheet metal screws. Provide self-drilling, self-tapping screws where required by conditions.
- F. Roofing panels shall be manufactured in continuous lengths to eliminate perpendicular panel end laps. End laps will not be allowed.

2.4 ROOF SYSTEM ACCESSORIES

- A. Provide closure strips formed to fit panel profile as required. Closure shall be closed cell EPDM synthetic rubber, factory formed closure to match roofing panel, or manufacturer's standard watertight components.
- B. Gutter, Downspout, Trim, and Flashings

1. Concealed Gutters, downspouts, ridge cap, and curbs shall be furnished in 24 gauge color finish on all exposed sides and edges, matching the roof panel finish. Unexposed sides and edges shall be standard baked-on finish. Form to configuration indicated on the Drawings. Provide gutter straps of 24 gauge color finish to match gutter and roof panels. Provide concealed gutter design.
 - a. Provide concealed 12 gauge downspouts at all locations.
 - b. Provide extruded aluminum .125-inch-thick from ground to 8'-0" for downspouts. Finish and color to match upper downspouts and gutters.
 2. Fascia, eave, and rakes shall be 22 gauge color finish on all exposed sides and edges.
- C. Sealant: The standard of quality shall be that of a reputable and established sealant manufacturer, approved by the manufacturer of the metal building in which the sealant is used. Sealants shall have good cohesion as well as good adhesion to the protective coated metal and shall not be corrosive to components on which it is applied. Each shall have adequate handling characteristics during normal ranges of construction or erection temperatures. The sealant shall be one that will retain its weather sealing properties under the conditions for which it is used and each (sealant) is recommended for only the applications listed hereafter.
1. Extrudable sealant, non-migratory, nondrying, and non-skinning synthetic elastomer base material conforming to the National Association of Architectural Metal Manufacturer's NAAMM Standard SS-1a-68, and except for the "tack free time", shall conform to the performance requirements of Federal Specification TTC-598-b Type 1. Use at the following locations:
 - a. Factory applied sealant in longitudinal ribs of standing seam roof panels.
 - b. Spot sealing laps (where applicable) of standing seam roof panels.
 - c. Sealing ridge cover and miscellaneous flashing.
 - d. Sealing curbs for roof accessories.
 2. Extruded butyl material conforming to performance requirements of Military Specification #MIL-C-18969B Type II Class B. With the exception of the "compressor set" requirement, it shall also conform to the National Association of Architectural Metal Manufacturer's NAAMM Standard #SS-1b-68 Class A for non-skinning resilient preformed compounds. Size of tape shall be that recommended by the building manufacturer. Use at the following locations:
 - a. Sealing swaged end laps of standing seam roof panels.
 3. Extrudable sealant, nondrying (but skinning) and nonmigratory synthetic elastomer base material, conforming to the performance requirements of Federal Specification TT-C-598- b Type 1. Use at the following locations:
 - a. Sealing ridge channels
 - b. Sealing exposed seams, butts, and laps at roof curbs
- D. Membrane Underlayment: Provide one of the following:
1. "WinterGuard HT," CertainTeed Corp.
 2. "Grace Ultra," Grace Construction Products
 3. "TW Metal and Tile Underlayment," Tamko Roofing Products

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Areas on which insulation and metal roofing is to be installed shall be completely secured and free of dirt and debris.
- B. Notify Architect in writing of defects in substrate that would be detrimental to metal roofing installation prior to start of Work.
- C. Start of insulation and metal roofing installation shall constitute acceptance of substrates by this Contractor.
- D. Membrane Underlayment: Install membrane underlayment over 100% percent of the roof area in accordance with the membrane manufacturer's written installation instructions.

3.2 METAL ROOFING INSTALLATION

- A. Erection of the preformed metal roofing system shall be performed in accordance with the manufacturer's erection drawings.
- B. Set bearing plates on surface of insulation board at standing slip angle locations.
- C. Install concealed clips on top of bearing plates with self-drilling shoulder screws into metal roof deck below. Size and length of screws and bearing plates shall be as recommended by manufacturer.
- D. Interlocking ribs shall be crimped together by an electric powered mechanical device in accordance with the roof manufacturer's instructions, immediately after securing in place.
- E. Preformed metal roofing, fascia, and gutter work shall be watertight and weathertight, lines and angles sharp and true, plain surfaces free from waves and buckles. Workmen shall be experienced in the trade and thoroughly capable of performing the Work in accordance with these requirements.
- F. Fasteners are to be concealed wherever possible. Exposed fasteners shall be stainless steel painted to match.
- G. Brake formed cap, trim, closure, and flashing sections are to be furnished with a minimum of joints.
 - 1. Brake formed members with exposed corner intersections shall have corner pieces shop fabricated. Other miscellaneous trim corners may be field cut, mitered, or butted.
 - 2. Trim shall be of the same material as, and have a finish to match, the metal roofing panels.
- H. Install roof jacks at pipe penetrations in metal roofing and roof curbs at all roof mounted equipment indicated on the Drawings. Provide required fastened, foam rods, plastic cement, and other sealant or material to provide watertight and weathertight construction.
- I. Install panels and accessories in strict accordance with the panel manufacturer's written instructions and the approved shop drawings. Use electrically driven "crimper tool" for closing seams wherever

possible. Attach panels to framing members per the manufacturer's written instructions, providing fixed anchorage or allowing thermal movement where specified on shop drawings.

- J. Use appropriate clips, fasteners, braces, and anchors as indicated on the Drawings and any other items required for a complete installation and as recommended by manufacturer.
- K. Make repairs and perform additional work necessary to provide a roof watertight and acceptable to the Architect prior to start of roofing guarantee.
- L. The installation shall be designed to safely resist the positive and negative loads.
- M. Roof panels shall be able to support walking loads without excessive distortion or telegraphing of the structural supports. For the maximum span used on the project, panels shall withstand a 250-pound concentrated load applied to a 4-square inch pad located at the center of the panel flat without buckling of the rib or noticeable permanent distortion of the panel.
- N. Roof panel and flashing attachments shall be designed to accommodate the thermal expansion and contraction of the exterior material through a total of 150 degrees F. temperature change.
- O. Factors of safety on design loads to ultimate strength of fasteners shall be as stated in the industry standard for the material into which the fastener is driven.
 - 1. AISI for steel
- P. Provide all items and accessories as required for a complete installation in every respect.

3.3 GENERAL INSTALLATION PROVISIONS

- A. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- B. Inspect materials immediately upon delivery and again prior to installation. Reject damaged and defective items.
- C. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- D. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- E. Recheck measurements and dimensions, before starting each installation.

END OF SECTION 07 41 13

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Related Sections
 - 1. Division 07 – Thermoplastic Roofing for collector boxes and downspouts
 - 2. Division 07 – Curved Metal Roof Panels for gutters and downspouts

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Metal counter flashing and base flashing
 - 2. Metal wall flashing and expansion joints
 - 3. Miscellaneous sheet metal accessories
 - 4. Concrete splash blocks
 - 5. Roof curbs
 - 6. Roof expansion joints covers
 - 7. Gutters and Downspouts
 - 8. Sealants and bonding agents between components of this Section and between the roof and other materials
- B. Provide all accessories and items essential for the completeness of the sheet metal installation. Such items, unless otherwise shown on the Drawings or specified, shall be the same kind of materials as the item to which applied. Nails, screws, and bolts shall be of the types suited for the purpose intended, and shall be compatible with the metal to which it will contact.
- C. Forming and assembling of sheet metal components shall be performed using methods that will not void the manufacturer's finish warranties.
- D. All flashing and sheet metal items shall be provided and installed to provide for a complete watertight and weathertight installation in every respect.
- E. Coordinate the work of this section with the following:
 - 1. Section 07, Metal Roof Panels
 - 2. Section 07, Thermoplastic Membrane Roofing
 - 3. Warranty for work of this section shall be the same as for the work of each roof system specified above.

1.3 SUBMITTALS

- A. Product data, Flashing, Sheet Metal, and Accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and

fabricated product.

- B. Samples of the following flashing, sheet metal, and accessory items:
 - 1. 8-inch-square samples of specified sheet materials to be exposed as finished surfaces.
 - 2. 12-inch-long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.
- C. Shop drawings showing layout, profiles, methods of joining, and anchorages details, including major counterflashing, trim/fascia units, and expansion joint systems. Provide plan layouts at 1/4-inch scale and details at 3-inch scale, for all sheet metal pieces and accessories.
 - 1. Coping and edge metal shop drawings are to be signed and sealed by a structural engineer licensed in the State of Florida. Show wind loading compliance.
- D. Shop drawings for the equipment support curbs shall be signed and sealed by a Registered Engineer in the State of Florida. Shop drawings for the equipment support curbs shall be complete and indicate all details of constructions. Gauges and types of materials, and all connection details and materials. Coordinate with the roofing Sections in Division 07.
- E. Submit equipment support curb guarantee as specified herein.
- F. Submit coping and edge metal watertight guarantee as specified herein.
- G. Reproductions of Architectural Details will not be permitted.

1.4 QUALITY ASSURANCE

- A. Where pre-engineered manufactured systems are specified, other field fabricated or shop fabricated substitutions will not be accepted.
- B. All sheet metal flashings shall conform to the criteria of SMACNA "Architectural Sheet Metal Manual" whether or not detailed as such.
- C. Fabricator and installer shall be a company specializing in sheet metal work and installation with five (5) years documented experience.
- D. Coping and edge metal shall be designed to meet wind-loading requirements for the Florida Building Code, latest edition. Refer to Drawings for pertinent wind design information.
- E. Roof coping and edge metal shall be CERTIFIED by the manufacturer to meet performance design criteria according to the following test standards:
 - 1. ANSI/SPRI ES-1 Test Method RE-3 for Coping: Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems (current edition). The coping and edge metal system shall be tested simultaneously on horizontal and vertical surfaces and shall exceed horizontal and vertical design wind pressure as calculated in accord with the ANSI/SPRI ES-1 Test RE-3. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.5 PROJECT CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

1.6 GUARANTEE

- A. Provide a “will not blow-off” wind warranty for copings and edge metals complying with roofing system wind coverage rider specified in respective roofing membrane section. Provide rider coverage as indicated in Section 07 54 00 for membrane roofing system.
- B. The equipment support curbs shall be guaranteed to be free from defects in materials and workmanship for a period of fifteen (15) years from the Date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. The type and locations of the various kinds, gages, thickness, and finish of sheet metal to be used is specified hereinafter under the individual items. Where sheet metal is indicated on Drawings and kind or type of metal is not definitely specified, sheet metal shall match the type as used on the rest of the project.
- B. Sheet Aluminum: ASTM B209, alloy 3003, temper H14, AA-C22A41 clear anodized finish; 0.032-inch thick (20 gage) except as otherwise indicated.
- C. Extruded Aluminum: Manufacturer's standard extrusions of sizes and profiles indicated, 60063-T52, AA-C22A41 clear anodized finish; 0.080-inch minimum thickness for primary legs of extrusions.
- D. Stainless Steel: AISI Type 302/304, complying with ASTM A167, 2D annealed finish, soft, except where harder temper required for forming or performance.
- E. Prefabricated Reglets and Counterflashings: Basis of Design: Shall be as manufactured by the Fry Reglet Corp., 625 S. Palm Avenue, Alhambra, California, or equal.
 - 1. 2-Piece Assembly Type: Provide Type “SM” Springlok Flashing System as manufactured by Fry Reglet, Santa Fe Springs, California. Shall be surface mounted receiver with snap- in flashing made of 0.025 Epox-E-Koted aluminum with slots for expansion, punched approximately 16 inches o.c. for surface mounting. Provide factory fabricated mitered corners.
 - a. Provide Type MA at masonry
 - b. Provide Type ST/STX for stucco
 - c. Provide Type CO for concrete imbedment (poured in place only)
 - 2. Provide suitable screws or drive pins and washers for mounting to wall, similar to those indicated on the drawings.
 - 3. Products of other manufacturers will be acceptable providing they meet or exceed the quality specified, and they can provide products of the type, size, and function required, including approval by the Architect.

- a. W.P. Hickman Company, Asheville, North Carolina
 4. Shop fabricated components shall be accompanied by a signed and sealed engineer's drawing certifying compliance with wind loads shall be acceptable upon approval of Architect.
- F. Edge Metal and Coping:
1. .063" aluminum formed as indicated on the Drawings and as required for the installation. Concealed splice plate shall match color and finish of edge metal.
 2. Finish: Clear anodized aluminum, .7 mil minimum thickness per AAMA.
 3. Manufacturers:
 - a. W.P. Hickman Company, Asheville, North Carolina
 - b. Metal Era Roof Edge Systems, Waukesha, Wisconsin
 4. Shop fabricated components shall be accompanied by a signed and sealed engineer's drawing certifying compliance with wind loads shall be acceptable upon approval of Architect.
 5. Provide equivalent products complying with weathertightness, wind speeds and warranty lengths as specified for coping systems.
 6. All corners shall be pre-formed, mitered, and welded tight.
 7. All cleats shall be continuous, no exceptions.
- G. Concrete Splash Blocks
1. Sizes as indicated on the Roof Plans.
 2. Fix to roof with approved manufacturer's roofing cement or adhesive.
- H. Equipment Support Curbs:
1. Basis of Design: Provide roof curbs produced by Custom Curb. Products of other manufacturers are acceptable provided they comply with all technical requirements as specified herein.
 - a. The Pate Company
 - b. Portals Plus, Inc.
 - c. RPS Accessories
 - d. Thaler Metal Industries, Inc.
 2. Curbs shall be constructed using minimum 14 gauge galvanized steel, with fully mitered and welded corners, integral base plates, internally reinforced with 1" x 1" x 1/8" steel angle (curbs with any side longer than 3'-0"), and factory installed pressure treated wood nailers.
 3. Units shall be factory insulated with 1-1/2" thick three pound density fiberglass insulation.
 4. Minimum height of curb shall be 8" above finished roof. Curbs shall be constructed to match slope of roof and provide level top surface for mounting of mechanical equipment.
 5. Coordinate sizes required with Drawings.
- I. Roof Expansion Joint Covers: "Permaspan Roof Expansion Joint Model PSRR" as manufactured by W.P. Hickman Company, Asheville, North Carolina. Provide all items as required for a complete and watertight installation in every respect.
1. .063" aluminum formed as indicated on the Drawings and as required for the installation. Concealed splice plate shall match color and finish of edge metal.
 2. Finish: Clear anodized aluminum, .7 mil minimum thickness per AAMA.
 3. Shop fabricated components shall be accompanied by a signed and sealed engineer's

- drawing certifying compliance with wind loads shall be acceptable upon approval of Architect.
4. Provide equivalent products complying with weathertightness, wind speeds and warranty lengths as specified for roof expansion joint cover systems.
 5. All corners shall be pre-formed, mitered, and welded tight.
 6. All cleats shall be continuous, no exceptions.
- J. Wall Expansion Joints: "NW-Series No Wing Seal System" for 1-1/2 inch and 2 inch installations where indicated on the Drawings as manufactured by Balco, Inc
1. Provide Balco Lube Adhesive as required for the installation.
 2. Provide all items as required for a complete and watertight installation in every respect.
- K. Building A – Administration
1. Box Gutters: .022- inch galvanized steel sheet metal. Finish same as downspouts.
 2. 6" x 6" Downspouts: 022- inch galvanized steel Kynar 500/Hylar 5000 finish all exposed sides and edges. Color to match standing seam curved metal roof panels.
- L. Buildings B-C-D & E
1. 8" x 16" Scuppers and Collector Boxes: .040 inch aluminum sheet metal. Finish same as downspouts.
 2. 6" x 6" Downspouts: 040 inch aluminum with Class I clear anodized finish AAMA611, AA-M12C22A41, .018 mm or thicker all exposed sides and edges. Form to configuration indicated.
- 2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES:
- A. Solder: Solder containing lead shall not be used. Provide only 95% tin/5% antimony (95/5) or silver brazing. Conform to ASTM B32.
 - B. Fasteners: Same metal as flashing/sheet metal or other non- corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
 - C. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
 - D. Mastic Sealant: Polyisobutylene; nonhardening, non-skinning, non- drying, nonmigrating sealant.
 - E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 07 Section "Joint Sealers."
 - F. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior nonmoving joints including riveted joints.
 - G. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
 - H. Paper Slip Sheet: 5-lb. rosin-sized building paper.
 - I. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E 154.

- J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
- K. 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.
- L. Roofing Cement: ASTM D4586, Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- M. Flux: Use resin type flux for pre-tinned surfaces.

2.3 FABRICATION

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual," the manufacturer, Florida Building Code and other recognized industry practices, whichever is strictest in accordance to meet wind load requirements per the Structural Drawings. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal 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 nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. 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 elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. Aluminum Extruded Units: Fabricate extruded aluminum running units with formed or extruded aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine substrates and conditions under which metal flashings will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Separate dissimilar metals from each other by painting each metal surface in area of contact with a heavy application of bituminous coating.

3.3 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations. 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. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Install work with provisions for thermal expansion of flashings, gravel stops, and other items exposed for more than 15 feet continuous length. Maintain a watertight installation at expansion seams. Locate expansion seams where shown, or if not shown, in conformance with manufacturer's recommendations.
- C. Sheet metal work shall be watertight and weathertight; lines, arises, and angles sharp and true; plain surfaces free from waves and buckles. Workmen shall be experienced in the trade and thoroughly capable of performing the Work in accordance with these requirements.
- D. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- 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 methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 03 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division 04 sections.
- G. Install counterflashing 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.
- H. Install elastic flashing in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.
- I. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3-inch overlap, to form a continuous, waterproof system.

J. Reglet and flashing Installation

1. Install reglets in accordance with manufacturer's product data, level and true to line. Verify that through wall counter flashing occurs at or above reglet locations.
 - a. Concrete reglets: Install reglets after walls are built.
 1. Sawcut joint to receive reglet to a depth of approximately 1/4" greater than the depth of the horizontal back leg of reglet.
 2. Insert reglet into sawcut and wedge in place using lead wedges installed at 2'-0" o.c., maximum. Hammer wedges to a depth which will not interfere with sealant or backer rod.
 3. Install exterior sealant in accordance with Joint Sealants section, to form fillet bead minimizing holding of water.
 4. Install with top of reglet minimum 8" above roof surface.
 5. Install reglets with 1" factory formed end lap and counter flashing with 3" end lap.
2. Provide factory-fabricated corners at changes in direction.
3. Following installation of roofing, install counter flashing by snapping into reglet in accordance with manufacturer's product data. Overlap adjacent lengths 6" minimum, to allow for expansion and contraction. Caulk top edge of reglet using exterior sealant.

K. Flashing at Roof Penetrations (Miscellaneous)

1. Work under this Section shall include the flashing of roof penetrations not otherwise specified under other Sections.
2. Flashing at roof penetrations not detailed on the Drawing shall be performed according to the recommendations and specifications of the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), subject to approval by the Architect. The use of pitch pockets is not acceptable.

- L. Install coping and edge metal in strict accordance with the manufacturers written installation instructions and recommendation to provide for the weathertight guarantee as specified herein. Provide all items and accessories as required for a complete and watertight installation in every respect.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal 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 07 62 00

SECTION 07 84 13 – PENETRATION FIRESTOPPING

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 through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
 - 1. Division 22, Sections specifying duct and piping penetrations.
 - 2. Division 26, Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated walls including fire walls, fire partitions, smoke partitions, fire barriers and smoke barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E814:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire- resistance-rated assembly.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 - 1. Types of penetrating items.
 - 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 - 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
- D. Qualification Data: For Installer.
 - a. FMG Approved Installer: Submit copy of FMG Approval.
 - b. Non-FMG Approved Installer: Submit letter from manufacturers of products specified, wherein manufacturer recognizes as trained or approved, or certifies, firm and persons for installation of that manufacturer's products.
- E. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.
- F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.
- G. Field Quality-Control Inspection Reports. For firestops and smoke seals installed by Non-FMG Approved Installer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors".
 - 1. As an alternate to utilizing an FMG Approved installer, Contractor may utilize a non-FMG Approved installer under the following conditions:
 - a. Field inspection of installed firestop and smoke seal systems is undertaken in accordance with Article titled "Field Quality Control" at Contractor's expense.

- b. Non-FMG Approved Installer Qualifications: A firm experienced in installing firestop and smoke seal systems similar in material, design, and extent to that indicated; whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its firestop and smoke seal system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire- resistive joint systems in Project to a single qualified installer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system

manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:
 1. A/D Fire Protection Systems Inc.
 2. Grace, W. R. & Co. - Conn.
 3. Hilti, Inc.
 4. Johns Manville.
 5. Nelson Firestop Products.
 6. NUCO Inc.
 7. RectorSeal Corporation (The).
 8. Specified Technologies Inc.
 9. 3M; Fire Protection Products Division.
 10. Tremco; Sealant/Weatherproofing Division.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal

surfaces, and non-sag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.

2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
3. Grade for Vertical Surfaces: Non-sag formulation for openings in vertical and other surfaces.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Install in strict accordance with the UL Design requirements and the manufacturers written installation instructions.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Field Testing: Field quality control testing is only required for firestops and smoke-seals installed by Non-FMG Approved Installer.
 - a. Inspecting Agency: Engage a qualified, independent inspecting agency to inspect firestop and smoke seal systems. Independent inspecting agency shall comply with the following requirements, including those related to qualifications, conducting inspections, and preparing test reports.
 - a. ASTM E 2174 "Standard Practice for On-Site Inspection of Installed Fire Stops".
 - b. ASTM E 2393 "Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers".
 - b. Inspection Services: Inspecting of completed firestop and smoke seal system

installations shall take place in successive stages as installation of firestop and smoke seal systems proceeds. Do not proceed with installation of firestop and smoke seal systems for the next area until inspecting agency determines completed work shows compliance with requirements.

- a. Report results in writing.
 - b. Inspecting agency shall state in each report whether inspected firestop and smoke seal systems comply with or deviate from requirements.
 - c. Remove and replace firestop and smoke seal systems where inspections indicate that they do not comply with specified requirements.
 - d. Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary to complete sealant work, both interior and exterior of the Project. The extent of each type of sealant and caulking work is indicated on the Drawings and specified herein.
 - 1. Work of this Section is to be subcontracted to a single firm specializing in sealant and caulking installation.
 - 2. Install in exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
 - a. Joints between different materials.
 - b. Perimeter joints between materials and frames of doors, windows and louvers.
 - c. Control and expansion joints in ceiling and overhead surfaces.
 - d. Other joints as indicated or required.
 - 3. Install in exterior joints in horizontal traffic surfaces as indicated below:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - 4. Install in interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
 - a. Perimeter joints of exterior openings where indicated.
 - b. Joints between tops of non-load-bearing unit masonry walls and underside of cast-in-place concrete slabs and beams.
 - c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - e. Perimeter joints of toilet fixtures and accessories.
 - 5. Install in interior joints in horizontal traffic surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - 6. The Work of this Section also includes the preparation of the sealant joint substrates and the installation of the sealant joint backings.
- B. Surface Hardness: Provide types of sealant to withstand anticipated abrasive or possible indentation as recommended by manufacturer.
- C. Compatibility: Provide materials that are compatible with the joint surfaces, joint fillers, and other materials in the joint system.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain

watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

- B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.4 SUBMITTALS

- A. Product data from manufacturers for each joint sealant product required.
 - 1. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.
- B. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- C. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.
- E. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project names addresses, names of Architects and Owners, plus other information specified.
- F. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
- G. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.
- H. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.
- I. Submit sealant warranties as specified herein.
- J. Submit pre-caulking conference meeting minutes.
- K. Submittal to indicate locations where each sealant is to be used.
- L. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product

provided.

- a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.5 QUALITY ASSURANCE

- A. Obtain elastomeric materials only from manufacturers who will, if required, send a qualified technical representative to project site for the purpose of advising the Installer of proper procedures and precautions for the use of the materials.
- B. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
 1. Shall be a sealant and caulking subcontractor with a minimum of 5 years of successful experience in the application of the types of materials required, and who agrees to employ only skilled tradesmen for the Work.
- C. Testing Laboratory Qualifications: To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying progress of the Work.
- D. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- E. Preconstruction Compatibility and Adhesion Testing: Submit joint sealant manufacturer's samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below:
 1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under normal environmental conditions that will exist during actual installation.
 2. Submit not less than 2 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
 3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.
 4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
 5. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required above that are acceptable to Architect and are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- F. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.
 1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C920. Include test results for hardness, stain resistance, adhesion and

cohesion under cyclic movement (per ASTM C719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.

2. Include test results performed on joint sealants after they have cured for 1 year.

G. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:

1. Locate test joints where indicated or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
3. Notify Architect one week in advance of the dates and times when mock-ups will be erected.
4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants by hand pull method described below:
 - a. Install joint sealants in 5-foot joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
 - b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at top of 2-inch cuts. Place a mark 1 inch from top of 2-inch piece.
 - c. Use fingers to grasp 2-inch piece of sealant just above 1-inch mark; pull firmly down at a 90-degree angle or more while holding a ruler alongside of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
6. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

H. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:

1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 degrees F.
 - 2. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.
- D. Preparation of joint surfaces, backing, and the conditions under which the sealant and caulking is to be installed shall conform to manufacturer's recommendations.
 - 1. Use of bond break tape is prohibited without the expressed permission of the Architect. Each situation will be evaluated with regard to inability to properly use backer rod to prevent adhesion.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

1.9 WARRANTIES

- A. All exterior and building envelope weathertight and watertight sealants shall be warranted by the sealant manufacturer for a period of twenty (20) years from the Date of Substantial Completion. Include coverage for installed sealants and accessories which fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, and or do not cure.
- B. All exterior and building envelope weathertight and watertight sealants shall be guaranteed by the specialized sealant contractor for a period of five (5) years from the Date of Substantial Completion, to be weathertight, watertight and moisture tight. Correct defective or failed joints and work within this time period at no cost to the building Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide selections made by Architect from manufacturer's full range of standard colors.

2.2 MATERIALS

- A. General
 - a. Where the term "Acceptable Standard" is used within this Section, it refers to the manufacturer and product listed, which is specified as the type and quality required for this Project.

- b. Products of other manufacturers will be considered, providing their products equal or exceed the quality specified, and they can provide products of the type and quality required.
 - c. Single source responsibility for joint sealer materials: Obtain joint sealer materials from a single manufacturer for each different product required.
 - d. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and final experience.
- B. Caulking Compounds (Acrylic Latex Sealant)
- a. Latex rubber modified, acrylic emulsion polymer sealant compound; manufacturer's standard, one part, non-sag, mildew resistant, acrylic emulsion sealant complying with ASTM C834, formulated to be paintable and recommended for exposed applications on interior locations involving joint movement of not more than plus or minus 5 percent.
 - b. A. Acceptable Standard
 - 1. "Sonolac"; Sonneborn Building Products, Inc.
 - 2. "Acrylic Latex Caulk"; Tremco, Inc.
 - 3. "Acrylic Latex Caulk with Silicone"; DAP
- C. One-Part Elastomeric Sealant (Silicone) (Exterior Joints)
- a. One component elastomeric sealant, complying with ASTM C920, Class 25, Type NS (non-sag), unless Type S (self-leveling) recommended by manufacturer for the application shown.
 - b. Acceptable Standard
 - 1) "Dow Corning 790"; Dow Corning Corp. (Dow Corning 791 with Kynar)
 - 2) "Pecora 864 Architectural Silicone Sealant; Pecora Corp.
 - 3) "Silpruf"; General Electric
 - 4) "Omniseal"; Sonneborn Building Products, Inc.
 - 5) "Spectrem 1"; Tremco Mfg. Co.
- D. One-part mildew resistant silicone sealant: (Around countertops and backsplashes and other wet interior locations.)
- a. Acceptable Standard
 - 1) "Rhodorsil 6B White"; Rhone-Poulenc Inc.
 - 2) "Dow Corning 786"; Dow Corning Corp.
 - 3) "Sanitary 1700"; General Electric
- E. Self-leveling polyurethane sealant, (for traffic areas and slabs-on-grade)
- a. Polyurethane self-leveling sealant, complying ASTM C920, Type S, Grade P, Class 25.
 - a. Acceptable Standard
 - 1) "Sonolastic SL 1"; Sonneborn Building Products, Inc.
 - 2) "NR-201 Urexpan"; Pecora Corp.
 - b. Acceptable Standard (2 Part)
 - 1) "Sonolastic SL 2"
 - 2) "NR-200"
 - b. Install in all horizontal control joints in concrete slabs-on-grade.
- F. Miscellaneous Materials
- a. Provide joint cleaner and joint primer sealer as recommended by the sealant or caulking

- compound manufacturer.
- b. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.
- c. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaners of type which are acceptable to manufacturers of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.

2.3 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834 and the following requirements:
 - a. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E90.
 - b. Product has flame spread and smoke developed ratings of less than 25 per ASTM E84.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
- C. Products: Subject to compliance with requirements, provide one of the following:
 - a. Acoustical Sealant: "AC-20 FTR Acoustical and Insulation Sealant," Pecora Corp.
 - b. Acoustical Sealant for Concealed Joints:
 - a. "BA-98," Pecora Corp.
 - b. "Tremco Acoustical Sealant," Tremco, Inc.

2.4 JOINT SEALANT BACKING

- A. Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - a. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, non-outgassing in unruptured state.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 SELECTION OF MATERIAL

- A. Caulking compounds shall be used for interior nonmoving joints and at locations specifically indicated on Drawings.
- B. One component elastomeric silicone sealants shall be used at all exterior joints and interior joints where thermal or dynamic movement is anticipated.
- C. One component elastomeric polyurethane sealants shall be used at interior joints where weatherproofing is required.

- D. One part self-leveling polyurethane sealants shall be used for exterior and interior horizontal joints subject primarily to pedestrian traffic and light and moderated vehicular traffic, and in all control joints in slab-on-grade; interior.
- E. Acoustical joint sealants shall be used at all walls that are STC rated or where sound attenuation blankets are used.

3.4 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 1. Interior joints which require caulking are to be caulked with the specified caulking compound, unless noted otherwise.
 - 2. Exterior joints which require sealant are to be filled with one of the specified sealants even though the note may read "Caulked".
 - 3. Joints to be filled shall be thoroughly dry and free from dust, dirt, oil, and grease at the time of application or caulks or sealants.
 - 4. Expansion and control joints in exterior walls shall have the joint filler material built into the wall, or between wall and slab, at the time of construction.
 - 5. Masking: Metal shall be masked with masking tape, as well as other surfaces where its required to prevent the sealant smearing the adjacent surface. Upon completion of the caulking, remove the tape.
 - 6. Sealants shall be integral color. Painting of sealants is not allowed.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material
- E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C1193, unless otherwise indicated.

3.5 CLEANING AND PROTECTION

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.
- B. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

3.6 GENERAL INSTALLATION PROVISIONS

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- E. Recheck measurements and dimensions, before starting each installation.
- F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

END OF SECTION 07 92 00

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Furnish materials and equipment necessary for complete installation of hollow metal doors, frames, and related items necessary to complete the Work indicated on Drawings and specified herein.
- B. Coordination: Refer to Section 08, GLAZING to obtain glass thickness requirements. Provide properly sized stops and bead to house the specified glass according to the glass manufacturer's recommendations and as indicated.
- C. The Work of this Section includes the installation of asphaltic emulsion coating on the concealed side of all hollow metal frames installed in CMU or concrete walls.

1.3 SUBMITTALS

- A. Product Data: Details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- B. Shop Drawings: Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.
 - 2. Indicate coordination of glazing frames and stops with glass and glazing requirements.
 - 3. Shop drawings for exterior door assemblies shall be signed and sealed by a licensed engineer registered in the State of Florida.
 - 4. Calculations for wind load design for exterior door assemblies shall be stamped, sealed and signed by a Professional Engineer in the State of Florida verifying compliance with ASCE/SEI 7-02.
- C. Label Construction Certification: For door assemblies required to be fire-rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.
- D. Obtain approval of shop drawings prior to proceeding with manufacturing.
- E. Submit current Miami-Dade NOA for exterior door and frame assemblies and Florida Product Approval.

- F. Submit warranty as specified herein.
- G. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E2074 and which are labeled and listed by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.
- C. Hollow metal supplier shall be a qualified direct distributor of products to be furnished. In addition, the distributor shall have in their regular employment an A.H.C./C.D.C. who will be available at reasonable times to consult with the Architect regarding matters affecting the door and frame openings.
- D. Exterior steel doors shall be designed to meet wind-loading requirements for the Florida Building Code, latest edition.
 - 1. Hurricane impact resistant units shall be resistant to penetration by flying missiles per SSTD 12-99.
- E. Preparation/Field Verification:
 - 1. Verify that Shop Drawings have been successfully submitted, reviewed and returned.
 - 2. Verify door frames are in proper location and have been properly anchored in accordance with Specifications and SDI 105 *Recommended Erection Instruction for Steel Frames*.
 - 3. Verify that frames comply with indicated requirements for type, size, location and swing characteristics and that they have been installed with plumb jambs and level heads.
 - 4. Verify that the correct door hardware has been delivered and doors have been prepped correctly.
 - 5. Proceed with installation of doors unsatisfactory have been corrected. Installation of doors and hardware indicates all conditions are satisfactory.
- F. Exterior door and window assembly installations shall be weather tight and leak proof.
- G. Contractor Qualifications: Employ only experienced Contractors (Installers) skilled in the successful installation of specified materials and assemblies on similar projects for not less than five (5) years. Installers shall be state certified or licensed subcontractors.
- H. Manufacturer's Qualifications: Employ only manufacturers who make the specified products as a regular production item.
- I. Single Source Limitations: Obtain steel doors and frames through a single source and from one manufacturer for entire work of Project.

- J. Structural Performance: Provide door and frame assemblies capable of withstanding wind pressures calculated according to the following:
 - 1. The building shall withstand wind loads: In accordance with the Florida Building Code, latest edition. See Structural drawings for the following requirements:
 - a. Ultimate Design Wind Speed:
 - b. Exposure:
 - c. Risk Category:

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish.
- B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new Work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames vertically at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch space between stacked doors for air circulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Except as otherwise specified herein or specifically approved by the Architect, hollow metal doors and frames shall be products of one of the following manufacturers subject to compliance with Specification requirements.
 - 1. Amweld International, LLC
 - 2. Architectural Openings, Inc.
 - 3. Ceco Door Products
 - 4. Curries Company
 - 5. Steelcraft Door and Frame Products
 - 6. Republic Doors and Frames

2.2 MATERIALS

- A. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008.
- B. Galvanized Steel Sheets: Hot dipped galvanized in accordance with ASTM A653, with A-60 coating designation, mill phosphatized
- C. Supports and Anchors: Fabricate of not less than 18-gage galvanized sheet steel.
- D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A153, Class C or D as applicable.
- E. Shop Painting:

1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."
2. Clean, treat, and paint exposed surfaces of fabricated hollow metal doors and frames, including galvanized surfaces plus back prime exterior hollow metal doors frames.
3. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before the application of the shop coat of paint.
4. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive field applied paint.
5. Coordinate primer compatibility with finish painting systems as specified Section 09, PAINTING.

- F. Asphaltic Emulsion Coating: Apply on the frames in the fabricator's shop; field application is not acceptable.

2.3 FABRICATION, GENERAL

- A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify Work that cannot be permanently factory assembled before shipment, to assure proper assembly at the project site. Lock edges of doors shall be beveled 1/8 inch in 2 inches.
- B. Panels and edge channels of exterior doors shall be fabricated from galvanized sheet steel. Panels and edge channels of interior doors shall be fabricated from cold rolled sheet steel. Sizes, types, and assemblies shall be as indicated on the Drawings, Door Hardware Schedule, and as specified.
- C. Fabricate concealed stiffeners, reinforcement, edge channels, and moldings from either cold rolled or hot rolled steel (at fabricator's option).
- D. Exposed Fasteners: Provide countersunk, tamper-resistant, flat Phillips heads for exposed screws and bolts.
- E. Door Hardware Preparation
1. Prepare hollow metal units to receive mortised and concealed door hardware, including cutouts, reinforcing, drilling, and tapping in accordance with final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation."
 2. Reinforce hollow metal units to receive surface applied hardware. Drilling and tapping for surface applied door hardware may be done at project site.
 3. Locate finish hardware as shown on final shop Drawings, or if not shown, in accordance with recommended hardware locations specified in "S.D.I. 100-98, Recommended Specifications, Standard Steel Doors and Frames," as published by the Steel Door Institute.
 4. Reinforce all steel doors and frames to receive surface mounted closers, whether or not scheduled to receive them.

2.4 DOOR TYPES

- A. The following door types shall conform to the Steel Door Institute Standards as described in SDI 100.
- B. Exterior doors shall be Grade III, 1-3/4 inches extra heavy duty, 16 gauge galvanized, Model 1, full flush, seamless design. (Unless indicated otherwise on the Drawings.)
1. Door face sheets shall be formed from one sheet of metal, with no visible seams on the door face edges. The top of the door shall be closed with a flush steel end closure treatment. The bottom of the door shall be closed with a recessed channel end closure. The interior core of the doors shall be rigid polystyrene slabs bonded to door face sheets.
 2. Down size width of doors, as required, where full mortise continuous gear hinges are scheduled.
 3. Face sheets shall be hot-dipped galvanized steel sheets conforming to ASTM A653, Commercial Steel (CS) Class B coating, mill phosphatized.
 4. Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level: Level 3 and Physical Performance Level A (Extra Heavy-Duty), Model 1 (Full Flush).
 5. Physical performance Level A and Level 3.
- C. Interior doors shall be Grade II, 1-3/4 inch heavy duty, 18 gauge cold rolled, Model 1, full flush, hollow steel construction.
1. Door face sheets shall be formed from one sheet of metal with not face seams. Seams on vertical door edges shall be tight, smooth, and devoid of irregularities. A kraft resin impregnated honeycomb core shall be permanently bonded to both door skins with thermal adhesive.
 2. Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical- endurance level:
 - 1) Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
- D. Lock edge of interior and exterior doors shall be beveled 1/8 inch in 2 inches.
- E. Hardware Preparation:
1. Provide minimum hardware reinforcing gauges as required in ANSI/SDI A250.6.
 2. Doors and frames shall be reinforced, drilled and tapped to receive mortised hinges, locks, latches, and flush bolts, as required in ANSI/DHI A115 and ANSI/SDI A250.6.
 3. Doors shall be reinforced for specified surface-mounted hardware. Perform drilling and tapping as required.
 4. Locate hardware in accordance with ANSI/SDI A250.8.
 5. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
 - 1) Hinges: Minimum 0.123 inch (3.0 mm) thick by 1-1/2 inches (38 mm) wide by 6 inches (152 mm) longer than hinge, secured by not less than 6 spot welds.
 - 2) Pivots: Minimum 0.167 inch (4.2 mm) thick by 1-1/2 inches (38 mm) wide by 6 inches (152 mm) longer than hinge, secured by not less than 6 spot welds.
 - 3) Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch (1.7 mm) thick.
 - 4) All Other Surface-Mounted Hardware: Minimum 0.067 inch (1.7 mm) thick.

2.5 DOOR ACCESSORIES

- A. Stops for light openings: Beads shall be screw applied. Screws shall be flat-head type and recessed flush with the surface of the stop. Glazed lights shall be 3" x 32" unless not allowed in a fire-rated door.
- B. Verify with Section 08, DOOR HARDWARE, and the undercut requirements for exterior doors with thresholds. Standard undercut will not be acceptable for low profile handicap thresholds.

2.6 FRAME TYPES

- A. Frames for exterior door openings shall be 14 gauge, fabricated from galvanized sheet steel.
 - 1. Frames for exterior use shall be hot-dipped galvanized steel after fabrication.
- B. Frames for interior door openings and borrowed lights shall be 16 gauge, fabricated from cold rolled sheet steel.
- C. Exterior Welded Frames: Frames shall be mitered only and set-up and welded, "SUW" with welds on exposed surfaces, dressed smooth and flush. Provide a temporary spreader bar securely fastened to the bottom of each frame.
 - 1. Welded frames shall be smooth, even, and have no blemishes or irregularities in finish or surface on all exposed sides and planes.
 - 2. Frames for exterior use shall have mitered corners welded continuously and finished frame faces (seamless).
 - 3. Headers and jambs shall be secured at corners either by external welding with seamless face joints.
 - 4. Frames shall be provided with temporary spreader bars for shipping and handling purposes.
 - 5. Knockdown and drywall type frames shall not be used unless dictated by specific project conditions leaving no other reasonable alternative.
 - 6. Mullions and transom bars shall be joined to adjacent members by welding. Face joints shall be welded and ground smooth (seamless).
 - 7. Frames shall be provided with a minimum of three anchors per jamb suitable for the adjoining wall construction. Anchors shall be minimum 18-gauge steel or 7-gauge wire. Frames over 7'-6" shall be provided with additional wall anchors as required.
 - 8. In addition, frames shall be provided with minimum 18-gauge base anchor. For existing masonry wall conditions that will not accept base anchor, an additional jamb anchor shall be provided.
 - 9. Frames shall be furnished in manufacturer's standard factory-applied coat of rust-inhibiting primer complying with ANSI/SDI A250.10 for acceptance criteria.
- D. Interior Frames: Provide fully welded type frames for interior door openings.
 - 1. Frames shall be provided with a minimum of three anchors per jamb suitable for the adjoining wall construction. Anchors shall be minimum 18-gauge steel or 7-gauge wire. Frames over 7'-6" shall be provided with additional wall anchors as required.
 - 2. In addition, frames shall be provided with minimum 18-gauge base anchor. For existing masonry wall conditions that will not accept base anchor, an additional jamb anchor shall be provided.
 - 3. Frames shall be furnished in manufacturer's standard factory-applied coat of rust-inhibiting primer complying with ANSI/SDI A250.10 for acceptance criteria.
- E. Frames for paired doors shall be furnished with a removable center mullion.

2.7 FRAME ASSEMBLIES

A. Frame Anchors

1. Wall anchors for frame attachment to masonry construction: Masonry anchors, adjustable, flat, corrugated or perforated 'T' shaped anchors with leg not less than 2 inches wide by 10 inches long or masonry "wire" type not less than 3/16 inch diameter.
2. Wall anchors for attachment to drywall partitions.
 - a. Use manufacturer's adjustable type compression anchors at drywall locations.
 - b. Use steel anchors sized to accommodate frame jamb depth and face dimension on all welded frames.
3. All frame jamb anchors to be provided; on each jamb per 30 inches of frame height or Fraction thereof.
4. Floor anchors: Angle clip type
 - a. 16 gauge minimum.
 - b. To receive 2 fasteners per jamb.
 - c. Welded to the bottom of each jamb.
5. In place masonry or concrete:
 - a. 3/8 inch countersunk flat head stove bolt expansion shields.
 - b. Weld pipe spacers or other type of spacers per manufacturer's standard design in back of frame soffit to protect frame profile during tightening of bolts and anchors.
6. Head struts: For frames not anchored to masonry or concrete construction provide ceiling struts spot welded to jambs each side extending to building structure where called for on schedule.
7. Sleeve anchors shall be fire rated for the types of openings required.

B. Stops and Beads: Furnish 20 gauge metal glazing beads with the hollow metal frames and transoms, side lights, interior glazed panels, and other locations where beads are indicated in pressed steel frames

1. Exterior glazing beads shall be installed on the exterior side of frame with tamper-resistant screws to comply with wind loading.

C. Plaster Guards: Provide 26 gauge steel plaster guards or mortar boxes, welded to the frame, at back of door hardware cutouts where mortar or other materials might obstruct hardware operation.

D. Door Silencers: Drill stops and install 3 silencers on strike jambs of single swing frames and 2 silencers on heads of double swing frames.

2.8 FIRE DOORS AND FRAMES

A. Provide approved and labeled hollow metal fire doors and frames at locations indicated in Door Schedule. Approved doors, frames, and hardware shall be constructed and installed in accordance with requirements of NFPA 80 and tested by UL (Underwriter's Laboratories, Inc.) or WH (Warnock Hersey) for the class of door opening indicated in schedules.

B. Labeled metal frames are required for labeled wood doors.

C. All labels shall be metal, attached to the frame where required by code. Stamped labels will not be acceptable.

2.10 ASPHALTIC EMULSION COATING

- A. Emulsion coating for steel door frames shall be water-based, brush applied, emulsion dampproofing. Basis of Design:
 - 1. "Sealmastic" by W.R. Meadows.
 - 2. Approved Equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.
 - 1. Set frames prior to construction of enclosing walls and ceilings. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 2. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a) Masonry Type: Locate anchors not more than 18 inches (*457 mm*) from top and bottom of frame. Space anchors not more than 32 inches (*813 mm*) o.c. and as follows:
 - (1) Three anchors per jamb up to 60 inches in height.
 - (2) Four anchors per jamb from 60 to 90 inches in height.
 - (3) Five anchors per jamb from 90 to 96 inches in height.
 - (4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches) or fraction thereof more than 96 inches in height.
 - (5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - b) Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - (1) Three anchors per jamb up to 60 inches in height.
 - (2) Four anchors per jamb from 60 to 90 inches in height.
 - (3) Five anchors per jamb from 90 to 96 inches in height.
 - (4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches) or fraction thereof more than 96 inches in height.
 - (5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - c) Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 - 3. Install fire-rated frames in accordance with NFPA Standard No. 80.
 - 4. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.
 - 5. Set frames in position; plumb, align, and brace securely until permanent anchors are set. Anchor bottom of frames to floors with expansion bolts or with power fasteners. Where frames require ceiling struts or other structural overhead bracing, they shall be anchored securely to ceilings or structural framing above, as indicated or specified.

6. The finished work shall be rigid, neat in appearance, and free from defects. Form molded members straight and true with joints coped or mitered, well formed, and in true alignment. Welded joints on exposed surfaces shall be dressed smooth so they are invisible after finishing.
 7. Grouting of metal frames is included in the work, in compliance with requirements of Section 04, CONCRETE UNIT MASONRY.
 8. Where anchor bolts are used in concrete or masonry openings, the bolt head shall be recessed, filled with bondo and sanded smooth.
 9. Provide filler plate at all hardware preps, such as hinge and strike preps, that are unused.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.
1. Install fire-rated doors with clearances as specified in NFPA Standard No. 80-07.
- D. Provide all items and accessories as required for a complete installation in every respect.

3.2 GENERAL INSTALLATION PROVISIONS

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

3.3 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

3.4 FIELD QUALITY CONTROL

- A. Damaged work will be rejected and shall be replaced with new work at no additional cost to the Owner or Architect.

- B. After installation, protect doors and frames from damage during subsequent construction activities.

END OF SECTION 08 11 13

SECTION 08 14 16 – FLUSH WOOD DOORS

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 the following:
 - 1. Solid-core flush wood doors.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
 - 4. Louvers for flush wood doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire ratings for fire doors.
- C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
 - 1. Faces of Factory-Finished Doors: Show the full range of colors available for stained finishes.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10-inches, for each material and finish. For each wood species and transparent finish, provide set of two samples showing typical range of color and grain to be expected in the finished work.
 - 2. Louver blade and frame sections, 6-inches long, for each material and finish specified.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

- B. Quality Standard: Comply with NWWDA I.S.1-A, "Architectural Wood Flush Doors".
- C. Fire-Rated Wood Doors: Doors 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 NFPA 252.
 - 1. Test Pressure: After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40-inches or less above the sill.
 - 2. Oversize, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide oversize fire door label or certificate of inspection, from a testing and inspecting agency acceptable to authorities having jurisdiction, stating that doors comply with requirements of design, materials, and construction.
 - 3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 degrees F maximum in 30 minutes of fire exposure.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flush Wood Doors:
 - a. Algoma Hardwoods Inc.
 - b. Eggers Industries; Architectural Door Division.
 - c. Marshfield Door Systems, Inc.
 - d. Mohawk Flush Doors, Inc.

- e. Vancouver Door Company, Inc.
 - f. VT Industries Inc.
2. Metal Louvers for Doors:
- a. Air Louvers, Inc.
 - b. Anemostat Door Products.
 - c. Gulfport Industries, Inc.
 - d. Hiawatha, Inc.
 - e. Leslie-Locke, Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Adhesives: Do not use adhesives containing urea formaldehyde.
- B. Doors for Transparent Finish:
- 1. Grade: Premium, with Grade A faces.
 - 2. Species and Cut: Red oak, plain sliced.
 - 3. Match between Veneer Leaves: Book match.
 - 4. Assembly of Veneer Leaves on Door Faces: Running match.
 - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - 6. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 10-feet or more.
 - 7. Transom Match: Continuous match.
 - 8. Stiles: Same species as faces or a compatible species.

2.3 SOLID-CORE DOORS

- A. Structural-Composite-Lumber-Core Doors:
- 1. Structural Composite Lumber: WDMAI.S.10.
 - a. Screw Withdrawal, Face: 700 lbf.
 - b. Screw Withdrawal, Edge: 400 lbf.
- B. Interior Veneer-Faced Doors:
- 1. Core: Either glued wood stave or structural composite lumber.
 - 2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.
- C. Fire-Rated Doors:
- 1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
 - 2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware.
 - 3. Edge Construction:
 - a. Non-Rated: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.
 - b. Fire Rated: Provide edge construction with intumescent seals concealed by outer stile matching face veneer, and laminated backing at hinge stiles for improved screw-holding capability and split resistance.

4. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.

2.4 LOUVERS AND LIGHT FRAMES

A. Metal Louvers:

1. Blade Type: Vision-proof, inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.0396-inch-thick, hot-dip zinc coated and factory primed for paint finish.
3. Metal and Finish: Extruded aluminum with Class II, clear anodic finish complying with AA-C22A31.
4. Metal and Finish: Extruded aluminum with Class II, color anodic finish complying with AA-C22A32/A34.
 - a. Color: As selected by Architect.

B. Fire Door Louvers: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire rating of one and one-half hours and less.

1. Metal and Finish: Galvanized steel, 0.0396-inch-thick, hot-dip zinc coated and factory primed for paint finish.

C. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same species as, or compatible with, door faces.
2. Profile: Manufacturer's standard shape.
3. At 20-minute, fire-rated, wood-core doors, provide wood beads and metal glazing clips approved for such use.

D. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

2. Light Openings: Trim openings with moldings of material and profile indicated.
3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing.
- B. Finish doors at factory.
- C. Transparent Finish:
 1. Grade: Premium.
 2. Finish: Manufacturer's standard finish with performance comparable to AWI System TR- 4 conversion varnish or AWI System TR-6 catalyzed polyurethane.
 3. Staining: As selected by Architect from manufacturer's full range.
 4. Effect: Semi-filled finish.
 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

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SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawing 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 non-rated and fire-rated access doors and frames.

1.3 SUBMITTALS

- A. Product Data: For each type of door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.
- B. Schedule: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics and that are labeled and listed by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction:
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article.
- B. Provide access doors at all VAV boxes, fans, valves, all fire/smoke dampers, and all other devices requiring service access in gypsum board ceilings. Coordinate locations with all other trades.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Access Doors:
 - a. Acudor Products, Inc.
 - b. J. L. Industries, Inc.
 - c. Larsen's Manufacturing Company.
 - d. Milcor Limited Partnership.

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), with Class C coating and phosphate treatment to prepare surface for painting; with minimum thickness indicated representing specified nominal thickness according to ASTM A 568/A 568M for uncoated base metal.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.
- D. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.
- E. Plaster Bead: Casing bead formed from 0.0299-inch zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster.

2.3 PAINT

- A. Shop Primer for Metallic-Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

2.4 ACCESS DOORS AND FRAMES

- A. Flush Access Doors and Trimless Frames: Fabricated from steel or metallic-coated steel sheet.
 - 1. Locations: As indicated.
 - 2. Door: Minimum 0.060-inch- thick sheet metal, set flush with surrounding finish surfaces.
 - 3. Frame: Minimum 0.060-inch- thick sheet metal with drywall bead or plaster bead as required.
 - 4. Hinges: Continuous piano hinge.
 - 5. Latch: Screwdriver-operated cam latch.

2.5 FABRICATION

- A. Provide access door assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials

with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Steel Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
 - 1. For trimless frames with drywall bead for installation in gypsum board assembly, provide edge trim for gypsum board securely attached to perimeter of frames.
 - 2. For trimless frames with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
 - 3. Provide mounting holes in frames to attach frames to metal or wood framing in plaster and drywall construction and to attach masonry anchors in masonry construction.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed. For cylinder lock, furnish two keys per lock and key all locks alike.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.7 METALLIC-COATED STEEL FINISHES

- A. Galvanizing of Steel Shapes and Plates: Hot-dip galvanize items indicated to comply with applicable standard listed below:
 - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. For galvanized surfaces, apply, after cleaning, a conversion coating suited to the organic coating to be applied over it. For metallic-coated surfaces, clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.
- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after cleaning and pre-treating.

2.8 STEEL FINISHES

- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install access doors with trim-less frames flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 41 13 – ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes missile impact /exterior aluminum doors and frame storefront system.

1.2 PERFORMANCE REQUIREMENTS

- A. Aluminum door and frame assemblies shall withstand wind loads in accordance with the Florida Building Code, latest edition. See Structural drawings for the following requirements.
1. Ultimate Design Wind Speed:
 2. Exposure:
 3. Building Risk Category:
 4. All exterior assemblies shall require Florida Product Approval.
- B. Windborne Debris Impact Resistant Performance (where required)
1. ASTM E1886 - Standard Test Method For Performance Of Exterior Windows, Curtain Walls, Doors And Impact Protective Systems Impacted By Missiles and Exposed To Cyclic Pressure Differentials
 2. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 3. Hurricane Resistant - Large Missile Impact of a 9 pound 2 by 4 for aluminum systems located within 30' of grade.
- C. Deflection: Limit mullion deflection to 1/240 of span with full recovery of glazing materials.
- D. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- E. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E283.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Water Leakage: None, when measured in accordance with ASTM E331 with a test

pressure difference of 10 lbf/sq ft

- H. Provide for expansion and contraction within system components caused by cycling temperature range of 180 degrees F over a 12-hour period without causing detrimental effect to system components and anchorage.
 - 1. Ensure doors function normally within limits of specified temperature range
- I. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's published data for specified system
 - 2. Maintenance Data to include in maintenance manuals.
- B. Shop Drawings:
 - 1. Show elevations, details and methods of assembling sections, hardware locations and installation methods, dimensions, shapes of materials, anchorage and fastening methods, wall opening construction details, and weather stripping.
 - 2. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings and Schedules.
 - 3. Shop drawings shall be signed and sealed by a licensed engineer registered in the State of Florida.
 - 4. Calculations for wind load design shall be stamped, sealed and signed by a Professional Engineer in the State of Florida verifying compliance with ASCE 7-10.
- C. Certifications:
 - 1. Provide test reports from AAMA accredited laboratories certifying the performance as specified.
 - 2. Test reports shall be accompanied by the storefront manufacturer's letter of certification stating that the tested storefront meets or exceeds the referenced criteria for the appropriate storefront type.
 - 3. Sample of Approved Product Label and location of attachment to assembly.
- D. Field quality-control test and inspection reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
 - 1. Engineering Responsibility: Preparation of data for aluminum-framed systems

including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.

- C. Design Requirements:
 - 1. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
 - 2. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
 - a. If modifications are proposed, submit explanatory data to Architect for review
 - 3. Provide concealed fastening.
 - 4. Provide storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
 - 5. Anchors, fasteners and braces shall be structurally stressed not more than 50 percent of allowable stress when maximum loads are applied.
 - 6. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
 - 7. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
 - 8. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle Products in accordance with AAMA - Curtain Wall Manual #10.

- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metal finishes and other materials beyond normal weathering.
 - d. Water leakage through fixed glazing and framing areas.
 - e. Failure of operating components to function properly.
 2. Warranty Period: Five year from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Kawneer Company, Inc.
1. Entrance: Series 350IR Outswing Aluminum Storefront Doors
 2. Storefront: Trifab 451 Framing System, 4 ½” depth
- B. Products of the following manufacturers are also acceptable:
1. Crawford Tracey
 2. EFCO
 3. YKK

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308
 5. Welding Rods and Bare Electrodes: AWS A5.10
- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment.
1. Structural Shapes, Plates, and Bars: ASTM A 36
 2. Cold-Rolled Sheet and Strip: ASTM A 1008
 3. Hot-Rolled Sheet and Strip: ASTM A 101

2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads and meet Performance Requirements.
 - 1. Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. 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 turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - 2. Reinforce members as required to receive fastener threads.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements
- E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
- F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type

2.4 GLAZING SYSTEMS

- A. Glazing: Provide 1" insulating laminated glass units. As specified in Division 08 Section, Glazing.
- B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.5 DOOR HARDWARE

- A. Heavy-duty units required for operation and to meet Performance Requirements; finish to match door. Install reinforcing for hardware as necessary.
 - 1. Offset Pivot Sets: Comply with ANSI A156.4, Grade 1; exposed parts of cast

- aluminum alloy; provide intermediate pivot for doors.
- 2. Overhead Closers: LCN 4040 Smoothee Surface Closer; or Architect approved equal. Provide parallel arms only.
- 3. Closers: Manufacturer's standard floor or overhead concealed.
- 4. Cylinders are supplied under Division 08 Section, Finish Hardware
- 5. Exit Device: Concealed Rod Device for double door set.
- 6. Pull Handles: Pulls with stainless steel US32D dull finish.
- 7. Thresholds: Provide thermal thresholds for system specified that meet ADA requirements.
- 8. Weather stripping as required for single or double door sets.

2.6 ACCESSORY MATERIALS

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

2.7 FABRICATION

- A. Form aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing from interior.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).
- E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- F. Doors: Reinforce doors as required for installing hardware.
 - 1. At pairs of exterior doors, provide sliding weather stripping retained in

- adjustable strip mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

2.8 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Match Existing Anodic Finish: Architectural Class I, Dark Bronze AA-M10C21A44 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. Do not proceed until unsatisfactory conditions have been corrected.
 2. Verify cleaning of masonry is complete prior to installation of aluminum windows.

3.2 INSTALLATION

- A. General:
1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 6. Seal joints watertight, unless otherwise indicated.
- B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion

- by painting contact surfaces with bituminous paint
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section, Joint Protection and to produce weathertight installation.
 - E. Install components plumb and true in alignment with established lines and grades, without warp or rack.
 - F. Install glazing as specified in Division 08 Section, Glazing
 - G. Install sealants as specified in Division 07 Section, Joint Protection.
 - H. Entrances: Install to produce smooth operation and tight fit at contact points.
 - 1. Install to produce tight fit at weather stripping and weathertight closure.
 - 2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
 - I. Install perimeter joint sealants as specified in Division 07 Section, Joint Protection and to produce weathertight installation.
 - J.
 - K. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch accumulative.
 - 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.
- 3.3 ADJUSTING
- A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.
 - 1. Adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

END OF SECTION 08 41 13

SECTION 08 51 13 – ALUMINUM WINDOWS

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 fixed aluminum-framed windows for exterior locations.

1.3 DEFINITIONS

- A. HC: Heavy Commercial.
- B. Performance grade number, included as part of the AAMA/NWWDA product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.
- C. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.
- D. Minimum test size is smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows with Florida Product Approval complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of test size indicated below:
 - 1. Structural Loads: Provide aluminum windows capable of withstanding wind pressures calculated according to the Wind Information below, using the appropriate factors and coefficients.
 - 2. The aluminum windows shall withstand wind loads in accordance with the Florida Building Code, latest edition.
 - a. Ultimate Design Wind Speed:
 - b. Exposure:
 - c. Nominal Design Speed:
 - d. Building Risk Category:
 - e. All exterior assemblies shall require Florida Product Approval.
 - 3. Windborne Debris Impact Resistant Performance

- a. ASTM E1886 - Standard Test Method For Performance Of Exterior Windows, Curtain Walls, Doors And Impact Protective Systems Impacted By Missiles and Exposed To Cyclic Pressure Differentials
 - b. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 - c. Hurricane Resistant - Large Missile Impact of a 9 pound 2 by 4 for aluminum systems located within 30' of grade.
- B. AAMA/NWWDA Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
1. Minimum size required by gateway performance requirements for determining compliance with AAMA/NWWDA 101/I.S.2 for both gateway performance requirements and optional performance grades.
 2. Performance Class: HC.
 3. Performance Grade: 65.
- C. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F ambient; 180 deg F) material surfaces.
- D. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/NAFS, Air Infiltration Test.
1. Maximum Rate: 0.3 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft.).
- E. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested According to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.
1. Test Pressure: 20 percent of positive design pressure, but not less than 15 lbf/sq. ft.

1.5 SUBMITTALS

- A. Product Data: Include construction details, NOA and Florida Product Approval, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, and finishes for each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, and operational clearances, detailing fabrication and assembly of aluminum windows.
 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on walls and jambs.
 - a. Demonstrate adequacy of receptor system.
 2. Architect reserves the right to require samples that show fabrication techniques, workmanship, and design of hardware and accessories.
- C. Qualification Data: For Installer, professional engineer, and testing agency.

- D. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing Work of this Section and who is acceptable to manufacturer.
 - 1. Engineering Responsibility: Preparation of data for aluminum windows including the following:
 - a. Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.
- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Provide AAMA-certified aluminum windows with an attached label.
- E. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.
- F. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Perform tests specified in "Field Quality Control" Article. Modify mockup construction and perform additional tests as required to achieve specified minimum acceptable results.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Pre-installation Conference: Conduct conference at Project site. Review methods and

procedures related to aluminum windows including, but not limited to, the following:

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review required testing and inspecting procedures.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
1. Failure to meet performance requirements.
 2. Structural failures including excessive deflection.
 3. Water leakage, air infiltration, or condensation.
 4. Faulty operation of movable sash and hardware.
 5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 6. Insulating glass failure.
- B. Warranty Period: Five years from date of Substantial Completion.
- C. Warranty Period for Metal Finishes: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
1. Basis of Design: **Winco (1150)** or Equivalent Systems meeting all project requirements by the manufacturers listed below:
 2. CGI Windows and Doors.
 3. Kawneer
 4. PGT Industries, Inc.

2.2 MATERIALS, GENERAL

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 24,000-psi ultimate tensile strength, not less than 16,000-psi minimum yield strength, and not less than 0.062-inch thickness at any location for the main frame and sash members.

- B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
 - 1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125-inch-thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
 - 2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.

- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.

- E. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and completely concealed when aluminum window is closed.
 - 1. Weather-Stripping Material: Elastomeric cellular preformed gaskets complying with ASTM C 509.
 - 2. Weather-Stripping Material: Dense elastomeric gaskets complying with ASTM C 864.
 - 3. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/NWWDA 101/I.S.2.

- F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

- G. Perimeter Sealants: As specified in Division 07 Section "Joint Sealants".

2.3 GLAZING

- A. Glass and Glazing Materials: Provide 1" insulating laminated glass units. Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units and as required to achieve wind and impact resistance, where indicated on the drawings.

2.4 FABRICATION

- A. General: Fabricate aluminum windows, in sizes indicated, that comply with requirements in article titled "Performance Requirements". Include a complete system for assembling components and anchoring windows.

- B. Fabricate aluminum windows that are re-glazable without dismantling sash or ventilator framing.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
 - 1. Where two windows of different frame depth occur, provide mullions and sub-frames to create a flush interior and exterior condition. Tube mullions are not acceptable.
- E. Sub-frames: Provide sub-frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch- (1.6-mm-) thick extruded aluminum. Finish to match window units. Provide sub-frames capable of withstanding design loads of window units.
 - 1. Where end reaction dictates, provide minimum 0.125" thick receptors to prevent receptor disengagement.
- F. Sill Flashing: Provide integral sill flashing with sill extender for window units of profile and dimensions indicated but not less than 0.062-inch- (1.6 mm-) thick extruded aluminum. Provide end dams. Finish to match window units.
- G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory. Comply with requirements in Division 08 Section "Glazing" and with AAMA/NWWDA 101/LS.2.

2.5 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 - 1. Clear Anodic Finish: Architectural Class I, clear coating AA-M10C22A41 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum"

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; operational clearances; and other conditions affecting performance of work.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

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

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather-tight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWDA 101/I.S.2.
- F. Anchor windows to resist forces according to requirements indicated in article "Performance Requirements".

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 501.2, Hose Nozzle Test expanded to test the joint between the aluminum window and adjacent construction, by applying same test pressures required to determine compliance in Part 1 "Performance Requirements" Article.
 2. Testing Extent: Two windows, of each type, as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested immediately after installation.
- C. Corrective Actions:
 1. Should any of the specimens fail the field test, the specimens may be modified or repaired, and retested.
 2. Should any of the specimens fail the second field test, the specimens may be additionally modified or repaired, and retested.
 3. All modifications and repairs made to the specimens shall be recorded, and the same modifications and repairs made to all the aluminum windows and adjacent construction on the project.

4. Should the second test fail, the Architect may require two additional windows or bays and their adjacent construction to be tested.
- D. Rejection: Failure of any of the specimens to meet the test requirements of the third test shall be cause for rejection of all aluminum windows and adjacent construction.
 1. Remove and replace windows where test results indicate that they do not comply with specified requirements.
 - E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.4 ADJUSTING
- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- 3.5 PROTECTION AND CLEANING
- A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
 - B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
 - C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove non-permanent labels and clean surfaces.
 - D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 51 13

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.

1. Door hardware for steel (hollow metal) doors.
2. Door hardware for aluminum doors.
3. Door hardware for wood doors.
4. Door hardware for other doors indicated.
5. Keyed cylinders as indicated.

- B. Related Sections:

1. Division 6: Rough Carpentry.
2. Division 8: Aluminum Doors and Frames
3. Division 8: Hollow Metal Doors and Frames.
4. Division 8: Flush Wood Doors.
5. Division 26 Electrical
6. Division 28: Electronic Security

- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

1. Builders Hardware Manufacturing Association (BHMA)
2. NFPA 101 Life Safety Code
3. NFPA 80 -Fire Doors and Windows
4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
5. UL10C – Positive Pressure Fire Test of Door Assemblies
6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities 2009
7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
8. Florida Building Codes
9. Miami-Dade requirements for Hurricane (NOA) for exterior openings.

- D. Intent of Hardware Groups

1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

1.3 SUBMITTALS:

A. Product Data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.
3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
4. Submit electronic copies of catalog cuts with hardware schedule.
5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2

B. Shop Drawings - Hardware Schedule: Submit electronic copies of detailed hardware schedule in a vertical format.

1. List groups and suffixes in proper sequence.
2. Completely describe door and list architectural door number.
3. Manufacturer, product name, and catalog number.
4. Function, type, and style.
5. Size and finish of each item.
6. Mounting heights.
7. Explanation of abbreviations and symbols used within schedule.
8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough- ins required for specific opening.

C. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.

D. Samples: (If requested by the Architect)

1. 1 sample of Lever and Rose/Escutcheon design, (pair).
2. 3 samples of metal finishes

E. Contract Closeout Submittals: Comply with Division 01 including specific requirements indicated.

1. Operating and maintenance manuals: Submit electronic file sets containing the following.
 - Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - Catalog pages for each product.
 - Name, address, and phone number of local representative for each manufacturer.
 - Parts list for each product.
2. Copy of final hardware schedule, edited to reflect, "As installed".
3. Copy of final keying schedule

4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1.

1. Exterior Openings Severe Windstorm Components testing: Listed and labeled by a testing and inspecting agency acceptable to authority having jurisdiction, based on testing according to ANSI A250.13. Further compliance with Florida Building Codes for Hurricane (NOA) for Exterior Openings.
 2. Statement of qualification for distributor and installers.
 3. Statement of compliance with regulatory requirements and single source responsibility.
 4. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
- Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - Hardware Schedule shall be prepared and signed by an AHC.
5. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
 6. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
- Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - Underwriters Laboratories requirements have precedence over this specification where conflict exists.
7. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

A. Refer to Conditions of the Contract

B. Manufacturer's Warranty:

1. Closers: Ten years
2. Exit Devices: Three Years
3. Locksets & Cylinders: Three years
4. All other Hardware: Two years.

1.8 OWNER'S INSTRUCTION:

A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

A. Extra Service 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 Section.

1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.

B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

Item: Manufacturer: Approved:

Hinges	Stanley	Bommer, McKinney
Detention Hinges	Stanley	See Division 1
Locksets	Best	Schlage, Sargent
Cylinders	Best	Sargent, Schlage
Exit Devices	Precision	or approved equal
Closers	Stanley	Dorma 8900, Norton
7500 Access Control System	By Security provider	
Door position switch	By Security provider	
Electric Strike	HES,	Dorma, Folger Adams
Power supply	Dorma Door Controls	
Push/Pull Plates	Trimco	Burns, Rockwood
Push/Pull Bars	Trimco	Burns, Rockwood
Protection Plates	Trimco	Burns, Rockwood
Overhead Stops	ABH	Rixson, Glynn Johnson
Door Stops	Trimco	Burns, Rockwood
Flush Bolts	Trimco	ABH, Burns
Coordinator & Brackets	Trimco	ABH, Burns
Threshold & Gasketing	National Guard	Reese, K.N.
Crowder		

2.2 MATERIALS:

A. Hinges: Shall be Five Knuckle Ball bearing hinges

1. Template screw hole locations
2. Bearings are to be fully hardened.
3. Bearing shell is to be consistent shape with barrel.
4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
5. Equip with easily seated, non-rising pins.
6. Non Removable Pin screws shall be slotted stainless steel screws.
7. Hinges shall be full polished, front, back and barrel.
8. Hinge pin is to be fully plated.
9. Bearing assembly is to be installed after plating.
10. Sufficient size to allow 180-degree swing of door
11. Furnish five knuckles with flush ball bearings
12. Provide hinge type as listed in schedule.
13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
15. UL10C listed for Fire rated doors.

B. Mortise Type Locks and Latches:

1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
2. At Detention door tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 1 and be UL10C.
3. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.

4. Provide 9001-Quality Management and 14001-Environmental Management.
5. Fit ANSI A115.1 door preparation
6. Functions and design as indicated in the hardware groups
7. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
8. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
9. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
10. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
11. Provide sufficient curved strike lip to protect door trim
12. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
13. Lock shall have self-aligning, thru-bolted trim
14. Levers to operate a roller bearing spindle hub mechanism
15. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
16. Spindle to be designed to prevent forced entry from attacking of lever
17. Provide locksets with 7-pin removable and interchangeable core cylinders
18. Each lever to have independent spring mechanism controlling it
19. Core face must be the same finish as the lockset.

C. Exit Devices:

1. Exit devices to meet or exceed BHMA for ANSI 156.3, Grade 1.
2. Exit devices to be tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.
3. Exit devices chassis to be investment cast steel, zinc dichromate.
4. Exit devices to have stainless steel deadlocking 3/4" through latch bolt.
5. Exit devices to be equipped with sound dampening on touchbar.
6. Non-fire rated exit devices to have 1/4" minimum turn hex key dogging.
7. Touchpad to be "T" style constructed of architectural metal with matching metal end caps.
8. Touchbar assembly on wide style exit devices to have a 1/4" clearance to allow for vision frames.
9. All exposed exit device components to be of architectural metals and "true" architectural finishes.
10. Provide strikes as required by application.
11. Fire exit hardware to conform to UL10C and UBC 7-2. UL tested for Accident Hazard.
12. The strike is to be black powder coated finish.
13. Exit devices to have field reversible handing.
14. Provide heavy duty vandal resistant lever trim with heavy duty investment cast stainless steel components and extra strength shock absorbing overload springs. Lever shall not require resetting. Lever design to match locksets and latchsets.
15. Provide 9001-Quality Management and 14001-Environmental Management.
16. Vertical Latch Assemblies to have gravity operation, no springs.
17. Approved Manufacturers
 - a. The following manufacturers will be approved contingent on meeting or exceeding the above performance criteria:
 - 1) Precision Manufactured by Stanley Security Solutions

D. Exit Devices with Weatherized True Architectural Finish 626W:

1. Exit devices to meet or exceed BHMA for ANSI 156.3, Grade 1.
2. Exit devices to be tested and certified by UL or by a recognized independent laboratory to meet or exceed the following:
 - A. Mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.
 - B. BHMA 156.3 – A156.18 Salt Spray Certified 600 Hours 3 X Standard.
 - C. MIL-STD-810G 509.6 Salt Fog Certified.
 - D. MIL-STD-810G 510.6 Sand & Dust Certified.
 - E. MIL-STD-810G 521.4 Icing/Freezing Rain Certified.
3. Exit devices chassis to be investment cast steel, zinc dichromate.
4. Exit devices to have stainless steel deadlocking $\frac{3}{4}$ " through latch bolt.
5. Exit devices to be equipped with sound dampening on touchbar.
6. Non-fire rated exit devices to have $\frac{1}{4}$ " minimum turn hex key dogging.
7. All Exterior components of the exit device including the Active case cover, Touch bar, device channel, slide channel fillers, Vertical rods, latch covers and device end cap, shall be constructed of a brass base metal then plated in a double dip two step process of satin nickel and chrome.
8. Exit device shall be available with options of WTS Weatherized touch bar switch and WALW Weatherized Exit alarm (hardwired)
9. Additional non-weatherized electrified options are compatible with the 626W. Non-weatherized options are not recommended for harsh environments.
10. Touchpad to be "T" style constructed.
11. Touchbar assembly on wide style exit devices to have a $\frac{1}{4}$ " clearance to allow for vision frames.
12. All exposed exit device components to be of architectural metals and "true" architectural finishes.
13. Provide strikes as required by application.
14. Fire exit hardware to conform to UL10C and UBC 7-2. UL tested for Accident Hazard.
15. The strike is to be black powder coated finish.
16. Exit devices to have field reversible handing.
17. Provide heavy duty vandal resistant lever trim with heavy duty investment cast stainless steel components and extra strength shock absorbing overload springs. Lever shall not require resetting. Lever design to match locksets and latchsets.
18. Provide 9001-Quality Management and 14001-Environmental Management.
19. Vertical Latch Assemblies to have gravity operation, no springs.
20. Approved Manufacturers
 - a. The following manufacturers will be approved contingent on meeting or exceeding the above performance criteria:
 - 1) Precision with 626W finish, Manufactured by Stanley Security Solutions or approved equal.

E. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

F. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1

2. UL10C certified
 3. Provide 9001-Quality Management and 14001-Environmental Management.
 4. Closer shall have extra-duty arms and knuckles
 5. Conform to ANSI 117.1
 6. Maximum 2 7/16 inch case projection with non-ferrous cover
 7. Separate adjusting valves for closing and latching speed, and backcheck
 8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 9. Full rack and pinion type closer with 1½“ minimum bore
 10. Mount closers on non-public side of door, unless otherwise noted in specification
 11. Closers shall be non-handed, non-sized and multi-sized.
- G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered
- H. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
 2. Surface overhead stops shall be heavy duty bronze or stainless steel.
- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
- K. Push Pull Bars: Provide ANSI J504, .1” Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
- L. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- N. Door Bolts: Flush bolts for wood or metal doors.
1. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.
 2. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
 3. Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
 4. Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.

- O. Coordinator and Brackets: Provide a surface mounted coordinator when automatic bolts are used in the hardware set.
 - 1. Coordinator, Certified ANSI/BHMA A1156.3 Type 21A for full width of the opening.
 - 2. Provide mounting brackets for soffit applied hardware.
 - 3. Provide hardware preparation (cutouts) for latches as necessary.

AA. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.

- 1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
- 2. UL10C Positive Pressure rated seal set when required.

BB. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.

- 1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
- 2. UL10C Positive Pressure rated seal set when required.

CC. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½” for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.

DD. Provide one wall mounted Telkee, Lund or MMF series key cabinet complete with hooks, index and tags to accommodate 50% expansion. Coordinate mounting location with architect.

EE. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Best CORMAX™ Patented 7-pin.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These

visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
 - 1. 1 each Grand Masterkeys
 - 2. 4 each Masterkeys
 - 3. 2 each Change keys each keyed core
 - 4. 15 each Construction masterkeys
 - 5. 1 each Control keys
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect, Owner, Contractor and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish electronic typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
 - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary

for proper installation and operation.

- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
 - 1. Check and adjust closers to ensure proper operation.
 - 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 - 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

Manufacturer List

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Others
DM	Dorma Door Controls
EE	EnerSys
FO	Folger Adam
NA	National Guard
PR	Precision
SD	Stanley Door Closers
SE	Securitech
SN	Sentrol
SP	Special Lite
ST	Stanley
TR	Trimco

Finish List

<u>Code</u>	<u>Description</u>
AL	Aluminum
32D	Satin Stainless Steel
600	Primed for Painting
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
626W	Weatherized Satin Chrome
628C	Nylon Silver Coated
GREY	Grey
BLACK	Black
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Option List

<u>Code</u>	<u>Description</u>
C	QUICK CONNECT WIRING OPTION
C	Quick Connect Wiring System
C4	CAM-STANDARD CAM
DE	DELAYED EGRESS
FL	Fire Exit Hardware
HC	Hurricane Code Device
MC	Metal Cover
SH	SECURITY HEAD SCREWS
SN	Sex Nuts (Pkg. of 4)
TS	TOUCHBAR MONITORING SWITCH
WS	Wind Storm Listed (Miami-Dade/Florida)
B4E	BEVELED 4 EDGES - KICK PLATES
CSK	COUNTER SINKING OF KICK and MOP
PLATES	
FSE	Fail Secure
IDH	Integrated Dr. Hardware (45HW,47HW)
LBR	LESS BOTTOM ROD
MLR	MOTORIZED LATCH RETRACTION
NRP	NON REMOVEABLE PIN HINGE
RP3	RINGS-7 PIN MORTISE
SEC	Security Screws
VIB	Double Visual Indicator Option
C181	CAM-ADAMS RITE MS CAM
C258	CYLINDER CAM
R703	STRAIGHT CYLINDER RING - 3/16"
R704	STRAIGHT CYLINDER RING - 1/4"
BB12-4	4.5 Ahr. Battery Backup for 12V (PS6)
BB24-4	4.5 Ahr. Battery Backup for 24V (PS6)
24-LENGTH	LENGTH CODE-1 1/2"
TORX SCREWS	TORX SCREWS (8) - STAINLESS
STEEL W/TORX SCREWS	TORX SCREWS
SPANNER 1/4-20 SSMS/LA	SS SPANNER HEAD MS/LEAD ANCHOR

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SECTION 08 80 00 – GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes glazing where glazing requirements are specified by reference to this Section:
 - 1. Storefronts
 - 2. Entrances and other doors
 - 3. Window units.
 - 4. Mirrors.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm (0.23 inch).
 - 2. Tinted and heat-absorbing glass thicknesses for each tint indicated are the same throughout Project.
 - 3. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following:
 - a. 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.
 - b. 1 lite per 1000 for lites set over 15 degrees off vertical and under action of wind or snow.
- C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Glazing installed in doors and windows for Enhanced Hurricane Protection Areas shall be

approved by the door or window manufacturer as a part of the certified product's system.

1.4 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Shop Drawings: Glazing Schedule of all openings indicating glass type, thickness, opening size and location. Schedule shall be submitted with shop drawings.
- C. Samples for Verification Purposes: 12-inch-square samples of each type of glass indicated, and 12-inch-long samples of each color required for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.
- D. Product Certificates: Signed by glazing materials manufacturers certifying that their products comply with specified requirements.
- E. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.
- F. Compatibility Test Report: From manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.
- G. Product Test Reports: For each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
- H. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 01.
- I. Draft warranties.
- J. Submit Florida Product Approval certificates.
- K. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.5 QUALITY ASSURANCE

- A. Comply with applicable codes and regulations and with the Consumer Product Safety Commission CPSC 16 CFR 1201 and with applicable recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual."

- B. Provide labels showing glass manufacturer's identity, type of glass, thickness, and quality. Labels shall remain on glass until it has been set.
 - 1. All clear tempered safety glass and fire rated glazing must have permanently affixed labels for verification.
 - 2. Safety glass mirrors must have permanently affixed labels for verification.
 - C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. FGMA Publications: "FGMA Glazing Manual."
 - 2. LSGA Publications: "LSGA Design Guide."
 - 3. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines"
 - 4. Applicable requirements for the 2014 Florida Building Code.
 - D. Safety Glass: Products complying with testing requirements of 16 CFR Part 1201 for Category II materials.
 - 1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
 - E. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - F. Fire-Resistive Glazing Products for Window Assemblies: Products identical to those tested per ASTM E 163, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - G. Contractor Qualifications: Employ only experienced Contractors (installers) skilled in the successful installation of the specified materials and assemblies on similar projects for a minimum of five (5) years. Installers shall be state-certified or licensed Sub-Contractors.
 - H. Manufacturer Qualifications: Provide products from only manufacturers with at least five (5) years experience making the specified materials as a current catalog and regular production item.
 - I. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:
 - 1. Primary glass of each (ASTM C1036) type and class indicated.
 - 2. Laminated glass of each (ASTM C1172) kind indicated.
 - J. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver glass to site in suitable containers that will protect glass from the weather and from breakage. Carefully store material, as directed, in a safe place where breakage can be reduced to a minimum. Deliver sufficient glass to allow for normal breakage. Glazing compounds shall arrive at the project site in labeled containers which have not been opened.
 - B. Protect glazing materials to comply with manufacturer's directions and as needed to prevent

damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

- C. Protect glass edges from damage during handling and installation. Damaged glass is defined as glass with edge damage or other imperfections that could weaken the glass and impair performance and/or appearance if installed.
 - 1. Remove damaged glass and legally dispose of off-site.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Install liquid sealants at ambient and substrate temperatures above 40 deg F.

1.8 WARRANTY

- A. Manufacturer's Warranty on Laminated / Insulating Glass: Submit written warranty signed by insulating glass manufacturer agreeing to furnish replacements for those laminated glass units that deteriorate, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.
- B. Manufacturer's Fire Glass Warranty: Submit manufacturer's limited written warranty.
 - 1. Warranty Period: Manufacturer's standard but not less than 5 years from Date of Substantial Completion.
- C. Manufacturer's Mirror Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within indicated period of time.
 - 1. Warranty Period: Manufacturer's standard but not less than 15 years from Date of Substantial Completion.
- D. Manufacturer's Special Warranty: All coated glass products shall be warranted against defects in materials and/or workmanship for the indicated warranty period.
 - 1. Warranty Period: Not less than ten (10) years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Primary Glass: Provide products from one of the following:
 - 1. PPG
 - 2. Guardian
 - 3. Pilkington
 - 4. AFGD
- B. Architectural Glass Fabricators: Provide products from one of the following:

1. All of the above primary glass manufacturers.
2. Globe-Amerada Glass.
3. Viracon
4. Trulite
5. Oldcastle Glass

C. Fire Rated Glass:

1. Glaverbel S.A.,
2. SAFTI *FIRST*
3. SCHOTT
4. Nippon Electric Glass Co., Ltd
5. Vetrotech Saint-Gobain North America Inc
6. Oldcastle Glass

2.2 GLASS TYPES AND USAGE

A. Exterior: Comply with FBC Energy Conservations. Latest edition TC402.4 – Fenestration U-Factor and SHGC Requirements. See Structural drawings for wind load requirements.

1. Glass for Exterior Doors, Sidelights, and Transoms: ¼ inch tinted (match insulated glass units), tempered glass. Color selected by Owner/Architect to match appearance of existing glass panels.
2. Insulating Glass: 1” insulated units (laminated if required to meet wind loads). Match appearance of existing glass panels.

B. Interior:

1. Glass for Interior Doors, Sidelights, and Windows: ¼ inch thick clear tempered glass.
2. Glass for Interior Fire Rated Doors and Windows: Provide tested and labeled fire-rated glazing.

2.3 PRIMARY FLOAT GLASS PRODUCTS

A. Float Glass: ASTM C1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select).

1. Class 1 (clear) unless otherwise indicated.
2. Class 2 (tinted, heat-absorbing, and light-reducing) where indicated.

B. Refer to requirements for glass units for performance characteristics of assembled units composed of tinted glass, uncoated, relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.

2.4 HEAT-TREATED FLOAT GLASS

A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

B. Uncoated, Clear, Heat-Treated Float Glass: ASTM C1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below.

1. Kind FT (fully tempered) at all locations.

C. Uncoated, Tinted, Heat-Treated Float Glass: ASTM C1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality q3 (glazing select), with tint color and performance characteristics for 6.0-mm-thick (0.23-inch-thick) glass

matching those indicated for annealed primary tinted float glass; kind as indicated below:

1. Kind FT (fully tempered) at all locations.

D. Coated, Clear, Heat-Treated Float Glass: ASTM C1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), with coating type and performance characteristics complying with requirements specified under coated glass products; kind as indicated below:

1. Kind FT (fully tempered) at all locations.

2.5 FIRE-RESISTIVE GLAZING PRODUCTS

A. Fire-resistive glazing products with an exposed surface film are not acceptable.

B. Fire-Protection Rating: As required for the assembly in which glazing material is installed.

1. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

2. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and 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 NFPA 257.

C. Impact Safety Rating: As required for the assembly in which glazing material is installed.

1. Glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

2. Glazing products shall be permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction.

D. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

E. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.6 ELASTOMERIC GLAZING SEALANTS

A. General: Provide materials as recommended by the manufacturer for the required application and condition of installation in each case. Provide only compounds which are proven to be fully compatible with surfaces contacted.

B. Silicone Rubber Glazing Sealant: Shall be silicon rubber, one part elastomeric sealant complying with FS TT-S-001543, Class A. Provide acid type for nonporous channel surfaces and provide nonacid medium-modulus type for porous channel surfaces.

C. Preformed Butyl Rubber Glazing Sealant: Shall be tape or ribbon (coiled on release paper) of polymerized butyl or mixture of butyl and polyisobutylene, compounded with inert fillers and pigments, solvent-based with minimum of 95 percent solids with thread or fabric reinforcement, tack-free within 24 hours, paintable, non-staining.

1. Provide combination tape and encased continuous rubber shim of approximately 50

durometer hardness.

- D. Glazing Sealant for Fire-Resistant Glazing Products: Identical to product used in test assembly to obtain fire-resistive rating.

2.7 GLAZING GASKETS

- A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C542, black.
- B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
 - 1. Neoprene, ASTM C864.
 - 2. EPDM, ASTM C864.
 - 3. Silicone, ASTM C1115.
 - 4. Thermoplastic polyolefin rubber, ASTM C1115.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following companies:
 - 1. Lock-Strip Gaskets:
 - a. Stanlock Div., Griffith Rubber Mills.
 - 2. Preformed Gaskets:
 - a. Advanced Elastomer Systems, L.P.,
 - b. Schnee-Morehead, Inc., an ITW Co
 - c. Tremco, Inc., an RPM Co.,

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).
- F. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rod stock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.

2.9 FABRICATION OF GLASS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with

recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

- B. Clean cut or flat grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

2.10 SAFETY GLASS MIRRORS

- A. Glass: Provide float glass manufacturer by horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed, unless otherwise indicated, and complying with FS DD-G-1403 for Grade B, style I (uncoated surfaces), Type I (float), quality q2.
- B. Glass Coating: Coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-0041 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
- C. Mirror Sizes: After application of glass coating, cut mirror glass to size as shown on Drawings and in $\frac{1}{4}$ inch glass thickness.
- D. Edges: Seal edge after treatment to prevent chemical or atmospheric penetration of backing. Preform edge treatment and sealing in factory immediately after cutting to final sizes.
- E. Mastic: Mirro-Mastic, Palmer Products Corp., Louisville, KY;
- F. Provide CRL mirror mount system in satin anodized finish. Continuous top channel shall be 2 pieces, D1638 channel and D1637 cleat. Bottom and ends shall have D638 channel.
 - 1. System shall be as manufactured by C.R. Laurence Co., Inc.,

PART 3 - EXECUTION

3.1 STANDARDS AND PERFORMANCE

- A. Watertight and airtight installation of each piece of glass required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure, including loss or breakage of glass, failure of sealants or gaskets to remain watertight and air tight, deterioration of glazing materials, and other defects in the Work.
- B. Protect glass from edge damage at all times during handling, installation, and operation of the building.
- C. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance, and adequate sealant thicknesses with reasonable tolerances. The glazier is responsible for correct glass size for each opening within the tolerances and necessary dimensions established.
- D. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing and their technical representatives except where more

stringent requirements are shown or specified.

- E. Comply with "Glazing Manual" by Flat Glass Marketing Association and the manufacturers of the glass and glazing materials except as shown and specified otherwise.
- F. Inspect each piece of glass immediately before installation and eliminate those which have observable edge damage or face imperfections.
- G. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw, and blow oriented in the same direction as other pieces.

3.2 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.4 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass from edge damage during handling and installation as follows:
 - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
 - 2. Remove damaged glass from Project site and legally dispose of off-site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- D. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:
 - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- C. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.

3.7 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.8 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08 80 00

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SECTION 08 91 16 – FIXED LOUVERS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes extruded aluminum, prefinished, drainable blade louvers

1.2 DEFINITIONS

- A. Louver Terminology: Refer to AMCA Publication 501 for definitions of terms for metal louvers.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Air Performance, Water Penetration, and Air Leakage Ratings: Provide louvers complying with performance requirements indicated as demonstrated by testing manufacturers stock units, of height and width indicated, according to Air Movement and Control Association (AMCA) Standard 500-L.
- B. Airborne Sound Transmission Loss: Provide acoustical louvers complying with airborne sound transmission loss ratings indicated, as demonstrated by testing manufacturer's stock units according to ASTM E90.
- C. Design aluminum door and frame assemblies in accordance with the Florida Building Code, latest edition. All exterior assemblies shall require Florida Product Approval.
1. Structural Loads: Provide aluminum windows capable of withstanding wind pressures calculated according to the Wind Information below, using the appropriate factors and coefficients.
 2. The louvers shall withstand wind loads: In accordance with the Florida Building Code, latest edition.
 - Ultimate Wind Speed: 132 mph (3 Sec gust)
 - Exposure: C
 - Risk Category II
- D. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 Deg F ambient, 180 Deg F material surfaces.

1.4 SUBMITTALS

- A. Product Data: Test reports evidencing compliance of units with Performance Requirements.
- B. Shop Drawings:

1. Plans, elevations, sections, and details showing profiles, angles, spacing of louver blades; unit dimensions related to wall openings and construction; free areas for each size indicated; and profiles of frames at jambs, heads and sills.
 2. Shop Drawings shall be signed and sealed by a licensed engineer registered in the State of Florida.
 3. Wind loading Calculations shall be stamped, sealed and signed by a Professional Engineer in the State of Florida verifying compliance with ASCE 7-10.
 4. Sample of Approved Product Label and location of attachment to assembly.
- C. Product certificates signed by louver manufacturers certifying that their products which comply with Project requirements are licensed to bear AMCA Seal based on tests made in accordance with AMCA Standard 500 and complying with AMCA Certified Ratings Program.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents from a single source where alike in one or more respects with regard to type, design, and factory-applied colorfinish.
- B. SMACNA Standard: Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for construction details and installation procedures.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check openings by field measurements before fabrication; show recorded measurements on final Shop Drawings.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Visually inspect all materials at time of delivery for damage. Any damaged boxes, crates, louver sections.
- B. Storage: Per manufacturer's instructions, off ground, covered with a weather proof flame resistant sheeting or tarpaulin.
- C. Handling: Handle in accordance with manufacturer's instructions

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Products of the following manufacturers are acceptable provided they are in compliance with technical requirements.
 1. Airolite Co.
 2. Ruskin Louvers

3. Greenheck Fan Corporation.

- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material and functional requirements.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.
B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
C. Aluminum Castings: ASTM B 26, alloy 319.
D. Fasteners: 300 Series stainless steel.
E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
B. Maintain equal louver blade spacing to produce uniform appearance.
C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
D. Include supports, anchorages, and accessories required for complete assembly.
E. Where indicated, provide low profile, heavy duty sub-sills made of same material as louvers for recessed louvers.
F. Join frame members to each other and to fixed louver blades in accordance with tested assembly and Performance Requirements.

2.4 LOUVERS

- A. Louvers shall be 6 inches deep with 35 degree stationary blades. Blades and frames shall be 0.081 inches extruded aluminum, alloy 6063-T5.
1. Louver shall be fitted with 16 by 18 mesh, 0.063 inches aluminum insect screen in extruded aluminum frames.
B. Louver blades shall be joined to each side frame and vertical stiffener with two, one inch long fillet Gas Metal Arc Welds with a minimum 1/8 inch throat.
C. Louvers shall bear AMCA Ratings Seals for air performance and water penetration ratings.
D. Minimum Free Area: 7.68 sq. ft. per 4' X 4' unit.

- E. Free area velocity: 721 fpm free area velocity at a pressure drop not exceeding .15 inches W.G. per AMCA Standard 500.
- F. Water Penetration: No more than .01 ounces of water per square foot of free area at a free area velocity of 1250 fpm when tested for 15 minutes per AMCA Standard 500.

2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Clear Anodic Finish: Architectural Class 1, clear coating AA-M10C22A41 (Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings to receive the work. Do not proceed until any unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work and in accordance with manufacturer's recommendations to meet Performance Requirements
- B. Erection Tolerances:
 - 1. Maximum variation from plane or location shown on the approved shop drawings: 1/8 inch per 12 feet of length, but not exceeding 1/2 inch in any total building length or portion thereof (noncumulative).
 - 2. Maximum offset from true alignment between two members abutting end to end, edge-to-edge in line or separated by less than 3 inch: 1/16 inch (shop or field joints). This limiting condition shall prevail under both load and no-load conditions.
 - 3. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
- C. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.

3.4 ADJUSTING AND CLEANING

- A. Test operable louvers and adjust as needed to produce fully functioning units that comply with requirements
- B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let debris accumulate until final cleaning.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating to the satisfaction of the Owner / Architect.

END OF SECTION 08 91 16

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SECTION 09 24 00 – CEMENT PLASTERING

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 the following:
 - 1. Nonstructural framing and furring.
 - 2. Exterior Portland cement plasterwork (7/8" 3 coat stucco) on metal lath over sheathing and accessories.
 - 3. Exterior Portland cement plasterwork (5/8" 2 coat stucco) on concrete unit masonry.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide installations capable of withstanding wind pressures calculated according to the Wind Information located on Drawings, using the appropriate factors and coefficients.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Provide drawings and details.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on adjacent construction.
- C. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40 deg F.
 - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 NON-STRUCTURAL STEEL FRAMING MEMBERS, GENERAL

- A. Components, General: Comply with ASTM C 1063. For steel sheet components not included in ASTM C 1063, comply with ASTM C 645 requirements for metal, unless otherwise indicated.
- B. Cold-Rolled Channels: Base metal thickness of 0.0538 inch with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
- C. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter, unless otherwise indicated.

2.2 METAL SUPPORTS FOR SUSPENDED AND FURRED SOFFITS

- A. Size metal ceiling supports to comply with ASTM C 1063, unless otherwise indicated.
- B. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
- C. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Channels: Cold-rolled steel, minimum 0.0598-inch-thick base (uncoated) metal and 7/16-inch-wide flanges, and as follows:
 - 1. Carrying Channels: 2-inch-deep-by-19/32-inch-wide flanges, 590 lb/1000 feet.
 - 2. Furring Channels: 3/4-inch-deep, 300 lb/1000 feet.
 - 3. Finish: ASTM A 653, G60 hot-dip galvanized coating for framing where indicated
- E. Steel Studs for Furring Channels: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 - 1. Thickness: 0.0329 inch, unless otherwise indicated.
 - 2. Depth: As indicated.
 - 3. Protective Coating: ASTM A 653, G40 galvanized coating

2.3 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating. Provide G90 for coastal applications as indicated on the drawings.
 - 1. Diamond-Mesh Lath: Flat and self-furring Wire Lath: ASTM C 1032; self-furring, with stiffener wirebacking.
 - a. Weight: 1.4 lb/sq. yd.
- B. Paper Backing: FS UU-B-790, Type I Grade D, Style 2 vapor-permeable paper.
 - 1. Provide paper-backed lath over sheathing at all exterior locations.

2.4 ACCESSORIES

- A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Zinc and Zinc-Coated (Galvanized) Accessories: (Accessories shall be G90 Galvanized for coastal applications as indicated on the drawings.)
 - 1. External-Corner Reinforcement: Expanded, large-mesh, diamond-metal lath fabricated from zinc-alloy and specially formed to reinforce external corners of Portland cement plaster on exterior exposures while allowing full plaster encasement.
 - 2. Cornerbeads: Fabricated from zinc.
 - a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
 - 3. Casing Beads: Fabricated from zinc; square-edged style; with expanded flanges.
 - 4. Control Joints: Fabricated from zinc; one-piece-type, folded pair of un-perforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 - 5. Expansion Joints: Fabricated from zinc; folded pair of un-perforated screeds in M-shaped configuration; with expanded flanges.
 - 6. Two-Piece Expansion Joints: Fabricated from zinc; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4-to-5/8-inch wide; with perforated flanges.

2.5 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in Portland cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of not fewer than three exposed threads.
- E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
- F. Isolation Strip at Exterior Walls:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), un-perforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch-thick, in width to suit steel stud size.
- G. Membrane Underlayment: 40 mil, SBS modified rubberized asphalt, with high strength polyethylene / polyester film facing for self-adhering application.
- H. Sealants: As specified in Division 07 Section "Joint Sealants".

2.6 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150, Type II.
 - 1. Color for Finish Coats: Gray.
- B. Masonry Cement: ASTM C 91, Type N.
 - 1. Color for Finish Coats: Gray.
- C. Portland and Masonry Cement Mixes Cement Color: Gray.
- D. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- E. Sand Aggregate: ASTM C 897.
- F. Ready-Mixed Finish-Coat Plaster: Mill-mixed Portland cement, aggregates, coloring agents, and proprietary ingredients.

2.7 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part Portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
 - b. Brown Coat: For cementitious material, mix 1 part Portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
 - 2. Masonry Cement Mixes:
 - a. Scratch Coat: 1 part masonry cement and 2-1/2 to 4 parts aggregate.
 - b. Brown Coat: 1 part masonry cement and 3 to 5 parts aggregate.
 - 3. Portland and Masonry Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part Portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
 - b. Brown Coat: For cementitious material, mix 1 part Portland cement and 1 part masonry cement. Use 3 to 5 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
- C. Base-Coat Mixes: Single base coats for two-coat plasterwork as follows:
 - 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

2. Masonry Cement Mix: Use 1 part masonry cement and 2-1/2 to 4 parts aggregate.
 3. Plastic Cement Mix: Use 1 part plastic cement and 2-1/2 to 4 parts aggregate.
- D. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.3 INSTALLING NON-STRUCTURAL STEEL FRAMING, GENERAL

- A. General: Comply with requirements in ASTM C 1063 for applications indicated.
1. Comply with ASTM C 754 for installation of items not addressed in ASTM C 1063.
- B. Install supplementary framing, blocking, and bracing at terminations in plaster assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 2. Isolate partition framing and wall furring where it abuts structure, except at floor. At head of assemblies, install slip-type joints that avoid axial loading and that support assembly laterally.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.
- E. Soffits: Unless otherwise detailed on Drawings, install furred or suspended soffits to comply with requirements for ceiling installation; install framed soffits to comply with requirements for partition installation.

3.4 INSTALLING STEEL FRAMING FOR SOFFITS

- A. Suspend ceiling hangers from building structure as follows:
 - 1. Install hangers plumb and free of contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to limit deflection to 1/360 of span while supporting ceiling loads.
 - 3. Wire Hangers: Secure by looping and tying, either directly to structure or directly to fasteners that are secure and appropriate for substrate, in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to fasteners that are secure and appropriate for substrate and hanger, in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Do not support ceilings directly from permanent metal forms. Secure to fastener devices that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect steel framing to or suspend it from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for ceilings so members are level to within 1/4 inch in 10 feet measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. Install steel framing components for ceilings in sizes and spacings indicated but not less than that required by the referenced steel framing and installation standards.
 - 1. Hanger Spacing: 48-inches.
 - 2. Main Runner (Carrying Channel) Spacing: For suspended ceilings, 36-inches.
 - 3. Cross-Furring Spacing: For suspended ceilings, 12-inches.
 - 4. Furring Spacing: For furred ceilings, 16-inches.
- E. Exterior Soffit Uplift Support: For exterior ceilings/soffits, install framing and cross bracing to resist indicated FBC wind load requirements. Unless indicated otherwise on Drawings, provide soffit uplift support against wind pressures by adding steel framing channels secured to soffit framing grid and securely attached to structure above.

3.5 INSTALLING METAL LATH

- A. Expanded-Metal Lath: Install according to ASTM C 1063.
 - 1. Vertical Partition Framing and Horizontal-Ceiling Framing: Install flat diamond-mesh lath.

3.6 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External Corners:
 - 1. Install lath-type external-corner reinforcement at exterior locations.

2. Install cornerbead at interior and exterior locations.
- C. Control Joints: Install control joints at locations indicated on Drawings and as follows:
1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft.
 - b. Horizontal and other Nonvertical Surfaces: 100 sq. ft.
 2. At distances between control joints of not greater than 18-feet o.c.
 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 4. Where control joints occur in surface of construction directly behind plaster.
 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.7 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
1. Do not deviate more than plus or minus 1/4 inch in 10-feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
 2. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6-inches at each jamb anchor.
 3. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 4. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry substrate, where required to achieve required plaster bond. Larsen Products Corp. – Weld-Crete or approved equal.
- C. Plaster Finish Coats: Apply to provide finish to match Architect's sample.

3.8 CUTTING AND PATCHING

- A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.9 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 09 24 00

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SECTION 09 29 00 – GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Non-load bearing steel framing members
 - 2. Gypsum board
 - 3. Glass-mat, water-resistant gypsum board
 - 4. Cement board
 - 5. MR board
 - 6. Plaster board
 - 7. Reinforcement, both metal and wood, within framing systems to support wall and ceiling mounted furnishings or equipment provided by other trades.
 - 8. Abuse resistant board
 - 9. Textured ceilings

1.3 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Sound Transmission Characteristics: For gypsum board assemblies indicated to have STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined per ASTM E90 and classified per ASTM E413 by a qualified independent testing agency.

1.5 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Product data for each type of product specified.
- C. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.
- D. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality– Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets

for each product provided.

- a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.6 QUALITY ASSURANCE

- A. Materials or operations specified by reference to the published specifications of a manufacturer or other published standards shall comply with the requirements of the standards listed.
 1. Standards include ASTM C840 and GA216.
- B. Refer to "Recommended Specification on Levels of Gypsum Board Finish" as published by the Gypsum Association (and AWCI/CISCA/PDCA) for finish levels required herein.
- C. Fire-Test-Response Characteristics: Where fire-rated gypsum board assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer.
- E. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- F. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- G. Installation Standards
 1. ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
 - a. Install steel studs and furring at 16 inches (406 mm) o.c.
 - b. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations. Install two studs at each jamb.
 2. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216
 - a. Provide gypsum wallboard with a Level 4 finish with Light Splatter Texture.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations. Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F for 48 hours prior to application and continuously after until dry. Do not exceed 95 deg F when using temporary heat sources.
- B. Ventilation: Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 STEEL FRAMING COMPONENTS FOR SUSPENDED CEILINGS

- A. Provide components of sizes indicated but not less than that required to comply with ASTM C754 for conditions indicated.
- B. Cast-In-Place and Post-Installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined from testing per ASTM E488 conducted by a qualified independent testing agency.
 - 1. Cast-in-place type designed for attachment to concrete forms.
 - 2. Chemical anchor.
 - 3. Expansion anchor.
- C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190 conducted by a qualified testing agency.
- D. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper.
 - 1. Tie wire shall be 18 gauge galvanized annealed wire.
 - 2. Hanger wire shall be 8 gauge galvanized annealed wire.
- E. Hanger Rods: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- F. Flat Hangers: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- G. Angle-Type Hangers: Angles with legs not less than 7/8-inch-wide, formed from 0.0635-inch-thick galvanized steel sheet complying with ASTM A653 Coating Designation G-90, with bolted connections and 5/16-inch-diameter bolts.

- H. Channels: Cold-rolled steel, 0.05980-inch-minimum thickness of base (uncoated) metal and 7/16-inch-wide flanges, and as follows:
 - 1. Carrying Channels: 1 ½ inch deep, 475 lb per 1000 feet, unless otherwise indicated.
 - 2. Furring Channels: 7/8 inch deep, 325 lb per 1000 feet, unless otherwise indicated.
 - 3. Finish: G-90 hot-dip galvanized coating per ASTM A653 for framing for exterior soffits and where indicated.
 - I. Steel Rigid Furring Channels: ASTM C645, hat-shaped, depth of 7/8 inch, and minimum thickness of base (uncoated) metal as follows:
 - 1. Thickness: 0.0329 inch, unless otherwise indicated.
 - 2. Protective Coating: G40 hot-dip galvanized coating per ASTM A653.
- 2.2 STEEL FRAMING FOR WALLS AND PARTITIONS
- A. Provide steel framing members complying with ASTM C645 requirements for metal and with ASTM A653/A 653M, G40 (Z120), hot-dipped galvanized zinc coating; and the following requirements:
 - 1. Component Sizes and Spacings: As indicated but not less than that required to comply with ASTM C754 under the following maximum deflection and lateral loading conditions:
 - a. Maximum Deflection: L/240 at 5 lbf per sq. ft.
 - B. Steel Studs and Runners: ASTM C645, with flange edges of studs bent back 90 deg and doubled over to form 3/16-inch-wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 - 1. Depth: 2 ½ inches, 4 inches, and 6 inches unless otherwise indicated.
 - 2. Deflection Top Track: Provide slotted slip track designed for deflecting overhead movement where indicated on the drawings. Provide in width required for wall.
 - a. Deflection top track shall be designed for rated wall assemblies where indicated on the Drawings.
 - C. Clip Angles: Corrosion resistant galvanized steel in 16 gage material. Clip angles shall be used to laterally brace metal studs to the interior side of the concrete unit masonry.
 - 1. Attach clip angles to wall and the metal stud at third points along the length of metal stud.
 - D. Hat - Shaped Furring Members: Manufacturer's standard hat-shaped furring members with slotted or non-slotted web, fabricated from steel sheet complying with ASTM C645; with a minimum base metal (uncoated) thickness of 0.0179 inch, face flange of 1 ¼ inch, wall-attachment flange of 7/8 inch, and of depth required to fit insulation thickness indicated.
 - E. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.
 - F. Unless indicated otherwise, metal stud framing shall be formed from the following gauge metal. If two conditions apply in the following listing, use the heavier gauge:
 - 1. Framed openings (heads and jambs of door and window openings) - 16 gauge.
 - a. 16 gauge studs; include two (2) studs at each jamb and at borrowed light framing, full height, and horizontal headers.
 - 2. Metal Stud Walls: 20 gauge studs spaced at 16 in. o.c. maximum.

2.3 GYPSUM BOARD PRODUCTS

- A. Provide gypsum board complying with ASTM C36, and of types indicated in maximum lengths available to minimize end-to-end butt joints.
1. Thickness: Provide gypsum board 5/8 inch thick to comply with ASTM C840 for application system and support spacing indicated.
- B. Gypsum Wallboard: ASTM C1396 and as follows:
1. Type: Regular for vertical surfaces, unless otherwise indicated.
 2. Type: Type X, where required for fire-resistive-rated assemblies.
 3. Type MR board where indicated.
 4. Thickness: 5/8 inch, unless otherwise noted.
 5. Edges: Tapered.
 6. Type: 1 inch thick gypsum wallboard liner panels.
- C. Glass-Mat Water-Resistant Gypsum Board: ASTM C1177, of type and thickness indicated below:
1. Type and Thickness: Type "X", 5/8 inch thick, unless otherwise indicated.
 2. Acceptable Products:
 - a. Dens-Glass Gold manufactured by Georgia Pacific Corp.,
 - b. GlasRoc by BPB America, Inc., Div. of CertainTeed Corp.,
 - c. e²XP Extended Exposure Gypsum Sheathing by National Gypsum Company
 - d. Securock Glass Mat Sheathing by USG
- D. Cement Board: Complying with ANSI A108.1, 5/8 inch thickness. To be used as backer-board at wall tile applications. Acceptable Products:
1. PermaBase by Gold Bond, National Gypsum Company,
 2. Wonderboard by Custom Building Products
 3. DUROCK Cement Board by United States Gypsum Co
- E. Abuse Resistant Gypsum Board: 5/8-inch thick. Acceptable Products:
1. Mold Tough AR by United States Gypsum Company
 2. Hi-Abuse XP Wallboard by National Gypsum Company
 3. Protecta AR 100 by LaFarge North America
- F. Plaster Board (Blue Board): ASTM C1396
1. Type and Thickness: Regular, 5/8 inch thick, unless otherwise indicated.
 2. Product: Provide manufacturer's standard hi-impact type board at locations scheduled to receive veneer plaster.
- G. Textured Finish
1. Provide "Light Splatter" type finish on all exposed interior drywall walls.
 2. Mock-Up: Provide a mock-up in a room designated for this finish.
 3. Install per the following:
 - a. Primer: Provide a primer coat to ensure uniform texture.
 - b. Texture: Shall be spray applied prior to painting.
 - c. Final Finish: to be approved by Architect from mock-up by Contractor.
 - d. Mock-Up: Approved mock-up can be part of work.

2.4 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Corner beads, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:
 - 1. Material: Zinc Alloy
 - 2. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047:
 - a. Cornerbead on outside corners, unless otherwise indicated.
 - b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwise indicated.
 - c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
 - d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
 - e. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.

- B. Reveal Trim: Provide in painted finish. Custom color selected by the Architect.
 - 1. Fry Reglet #DRM-625-100, 1 inch wide by 5/8 inch deep
 - 2. Fry Reglet #STR-050-063, 1/2" wide x 5/8" deep

- C. Inside corner trim at ceiling: USG #RP-2 or RPV-2.

2.5 JOINT TREATMENT MATERIALS

- A. Provide joint treatment materials complying with ASTM C475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
 - 1. Use pressure-sensitive or staple-attached open-weave glass-fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.
- C. Joint Tape for Cement Board: Polymer-coated, open glass-fiber mesh.
- D. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
 - 1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
 - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by the gypsum board manufacturer for this purpose.
 - 4. For topping compound, use sandable formulation.

- E. Joint Compound for Cement Board: As recommended by cementitious backer unit manufacturer.

2.6 MISCELLANEOUS MATERIALS

- A. Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

- B. Steel drill screws complying with ASTM C1002 for the following applications:
 - 1. Fastening gypsum board to steel members less than 0.03 inch thick.
 - 2. Fastening gypsum board to gypsum board.
- C. Steel drill screws complying with ASTM C954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
- D. Corrosion-resistant-coated steel drill screws of size and type recommended by board manufacturer for fastening cementitious backer units.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings, or if not shown, use vertical sliding slide clip application or use of deflection track and plate track two-piece system, or slip-joint with U-channel.
 - 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
 - 2. Where partition framing and wall furring abut structure, including steel beams, steel joists, at bottom of roof decks and floor decks, except at floor.
 - a. Provide slip-type joints as detailed to attain lateral support and avoid axial loading.

- D. Do not bridge building expansion and control joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.
- E. Provide all required accessories for a complete installation in every respect.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED CEILINGS

- A. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes or conduit.
- B. Sway-brace suspended steel framing with hangers used for support.
- C. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard.
 - 1. Wire Hangers: 0.1620-inch (8-gage) diameter, 4 feet o.c.
 - 2. Carrying Channels (Main Runners): 1-1/2 inch, 4 feet o.c.
 - 3. Rigid Furring Channels (Furring Members): 16 inches o.c.
- D. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring members or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.
- E. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- F. For exterior soffits, install cross-bracing and additional framing to resist wind uplift according to details on Drawings.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board

stud assemblies abut other construction.

1. Where metal framing is installed directly against exterior walls, install asphalt felt strips between studs and wall.
 - a. Metal framing includes Z-furring channels, hat-shaped furring, and metal studs.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Cut studs ½ inch short of full height. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 1. For STC-rated and fire-resistive-rated partitions requiring partitions to extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Terminate partition framing at height indicated on Drawings and continue to structure above where indicated.
- E. Install steel studs and furring in sizes and at spacing to comply with maximum deflection and minimum loading requirements.
- F. Install steel studs so that flanges point in the same direction and so that leading edges or ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.
- G. Frame door openings to comply with details indicated, with GA-219, and with applicable published recommendations of gypsum board manufacturer. Install two studs at each jamb. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Frame openings other than door openings to comply with details indicated or, if none indicated, in same manner as required for door openings. Install framing below sills of openings to match framing required above door heads.
- I. Under no circumstance may steel studs, partitions, or soffits be supported from the roof deck.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840 and GA-216.
- B. Install ceiling board panels across framing to minimize the number of abutting end joints and avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

- C. Install wall/partition board panels to minimize the number of abutting end joints or avoid them entirely. Stagger abutting end joints not less than one framing member in alternate courses of board. At stairwells and other high walls, install panels horizontally with end abutting joints over studs and staggered.
- D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings where possible.
- F. Attach gypsum panels to steel studs so that the leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Do not attach gypsum panels across the flat grain of wide-dimension lumber including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.
- I. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors, and doors over 32 inches wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- J. Form control joints and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels. Provide vertical control joints spread not more than 30 feet on center in partitions.
 - 1. USG Control Joint No. 093; or equal: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
 - a. Leave a 1/2 inch continuous opening between gypsum boards for insertion of surface-mounted joint.
 - b. Interrupt wood floor and ceiling plates with a 1/2 inch gap, wherever there is a control joint in the structure.
 - c. Do not attach gypsum board to steel studs on one side of control joint.
 - d. Provide separate supports for each control joint flange.
 - e. Provide an adequate seal and an additional layer of Type "X" gypsum board behind control joints where sound or fire ratings are prime considerations.
- K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chase walls that are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow ¼ to ½ inch wide joints to install sealant.
- L. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide ¼ inch to ½ inch wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant for non-fire-rated assemblies in accordance with Division 07 section "Joint Sealants." Seal joints in fire-rated assemblies in accordance with Division 07 Firestopping Section.
- M. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions for non-fire-rated assemblies in accordance with Division 07 section "Joint Sealants", and with a final bead of firestopping at both faces of fire-rated assemblies in accordance with firestopping sections. Comply with ASTM C919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.7 GYPSUM BOARD APPLICATION METHODS

- A. Single-Layer Application: Install gypsum wallboard panels as follows:
1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.
 3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistive-rated assemblies. Use maximum-length panels to minimize end joints.
 4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
1. Install cement board panels to comply with manufacturer's installation directions.
- C. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
1. Fasten with screws.
- D. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
1. Fasten with corrosion-resistant screws.

3.8 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
 - 1. Install LC-bead (J-bead) where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - 2. Install under window sills
 - 3. Install L-bead where edge trims can only be installed after gypsum panels are installed.
 - 4. Install U-bead where indicated.
- D. Install control joints at locations indicated, and where not indicated according to ASTM C840, and in locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

- A. Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated.
- B. Open joints, rounded or beveled edges, and damaged areas: Prefill with setting-type compound.
- C. Apply joint tape over gypsum board joints and to trim accessories with concealed face flanges as recommended by trim accessory manufacturer and as required to prevent cracks from developing in joint compound at flange edges.
- D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
 - 1. Level 4: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where textured finishes, wall coverings, and painted finishes are to be applied.

3.10 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 – TILING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The Work required under this Section consists of tile work, accessories, and related items, as shown on Drawings, and described in the Specifications.
 - 1. Ceramic tiles
 - 2. Waterproofing membrane
 - 3. Marble sills at restroom floors
 - 4. Expansion joints in tile

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated – including each required type of grout.
 - 1. Include 2 copies of chart showing available grout colors.
- B. Samples: One copy of manufacturer's prepared sample board showing actual piece of each available variety of each required tile type and 2 copies of printed type facsimiles (such as page from full color product catalog) of each piece.
- C. Shop Drawings: Submit complete set of shop drawings. Include plans, elevations, sections, and details for work as shown and/or indicated.
 - 1. Show attachment to other work and all transition details necessary to clearly indicate work.
- D. Pre-Installation Conference notes
- E. Mock-up.
- F. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.4 PERFORMANCE REQUIREMENTS

- A. Unless otherwise indicated, units shall comply with the following performance requirements:
 - 1. Static Coefficient of Friction (Slip Resistance) – per ASTM C1028:
 - a. Level Surfaces: Minimum 0.6
 - b. Treads of Stairs: Minimum 0.6
 - c. Surfaces of Ramps: Minimum 0.8

1.5 QUALITY ASSURANCE

- A. Installer's Qualifications: Work done under this Section of the Specifications shall be performed by mechanics skilled and experienced in the class of Work involved having successfully installed not less than 5 projects of similar size and scope to work of this Project.
 - 1. Installer shall be familiar with special requirements as herein indicated and shall comply with requirements of authorities having jurisdiction.
- B. Manufacturer's Qualifications: Experienced firm in the manufacture of products and/or systems similar to those required for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce units as required.
- C. Workmanship shall be in accordance with best trade practices, and surface shall be true to line and free from waves and other imperfections. Joints between tiles shall be maintained uniform and even and properly grouted.
- D. Pre-Installation Conference: Conduct conference at Project site in accordance with Division 01 Section, "Project Management and Coordination."
- E. Work shall comply with applicable requirements of the following:
 - 1. Tile Council of North America (TCNA) Installation Guidelines.
 - 2. NSI A108 Series.

1.6 PROJECT COLORS AND PATTERNS

- A. Colors, surface textures, and other appearance characteristics shall be as selected by the Architect. Selections shall be made from among manufacturer's standard products, regardless of differing price groupings.
- B. Architect reserves the right to use a maximum of 4 colors in each room/space at no additional cost.
- C. Architect shall select colors of grout from all available price groups.
- D. Provide 1% attic stock.

1.7 WARRANTY

- A. Provide manufacturers standard one (2) year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products of the following manufacturers will be acceptable, providing their products equal or exceed the type and quality of the specified products, and meet the other specification requirements. Basis of design: Specialty Tile Products. See Room Finish Schedule. Equivalent products meeting all project requirements including aesthetics may be approved from the following Manufacturers in compliance with Division 01, Section – Product Requirements.
1. American Olean Tile Co. Inc., Div. of Dal-Tile
 2. Crossville Ceramics Company, LP
 3. Dal-Tile Corporation
 4. Florida Tile Industries, Inc
 5. Shaw Commercial Hard Surface
 6. Specialty Tile Products
- B. Manufacturers of mortars and grouts:
1. Custom Building Products, Inc.,
 2. H. B. Fuller Co.,
 3. Laticrete International, Inc.,
 4. Mapei Corporation,
 5. StarQuartz Industries, Inc.
 6. Bostik (Hydroment)
 7. Star Quartz
- C. Ceramic tile accessories:
1. Ceramic Tool Company, Inc.,
 2. Schluter-Systems, L.P.,

2.2 CERAMIC TILE

- A. Glazed Ceramic Wall Tile: Provide standard grade ceramic glazed wall tile ANSI 137.1
1. Cushion edge units with a high gloss or semi-gloss impervious glazed finish fused to a ceramic tile body that may be non-vitreous but with water absorption not exceeding 20%.
 2. Furnish Master Grade Certification signed by both tile manufacturer and tile subcontractor stating that installed tiles meet ANSI 137.1 standards.
 3. Manufacturer's Glaze Warranty: Provide manufacturer's written warranty covering glaze for not less than 2 year from Date of Substantial Completion.
- B. Glazed Wall Tile Trim:
1. Furnish size, color, and shade to as selected by Architect.
 2. Provide square top, set-on type, cove base at other floors.
 3. Provide square edges at inside corners.
 4. Provide bullnose edges at outside corners and jambs.

2.3 PORCELAIN MOSAIC TILE

- A. Porcelain Mosaic Floor Tile: Provide Standard Grade ceramic mosaics conforming to ANS137.1 (latest revision).

1. Provide thick cushion edge, unglazed units of impervious natural clay or porcelain tile with water absorption not exceeding 3.5% and slip resistance as herein indicated.
 1. Furnish Master Grade Certification signed by both tile manufacturer and tile subcontractor stating that installed tiles meet ANSI 137.1 standards.
 3. Manufacturer's Glaze Warranty: Provide manufacturer's written warranty covering glaze for not less than 2 year from Date of Substantial Completion.
 4. Color Group 1.
- B. Porcelain Mosaic Trim:
1. Furnish size, color, and shade as selected by Architect.
 2. Provide ceramic mosaic cove bases, including corners.

2.4 SETTING MATERIALS

- A. Portland Cement: ASTM C150 Type 1.
- B. Latex-Portland Cement Mortar: ANSI A118.4.
- C. Hydrated Lime: ASTM C206 or C207 Type S.
- D. Sand: ASTM C144.
- E. Water: Clean and potable.
- F. Metal Lath: ANSI A42.4, expanded, painted, 2.5 lb./sq.yd. minimum.
- G. Dry-Set Mortars: ANSI A118.1.
- H. Latex-portland cement mortar-ANSI A118.4
- I. Organic Adhesive: ANSI A136.1, type as follows:
 1. Shower Locations: Type 1.

2.6 GROUTING MATERIALS

- A. One hundred percent solids epoxy grout, complying with ANSI A118.3 (at toilets and kitchens only).
- B. Latex Portland cement grout at all other locations.
- C. Color as selected by Architect.

2.7 MISCELLANEOUS MATERIAL

- A. Latex Underlayment: Quick set type, as recommended by membrane manufacturer, as required to provide positive drainage to floor drains.
- B. Waterproofing Membranes (if required):
 1. At thick-set applications: "Chloraloy 240", 40 mil thick, non-plasticized chlorinated polyethylene (CPE) thermoplastic sheet membrane by the Noble Company, Grand Haven, MI.

2. Membrane shall comply with ASTM D4068.
 3. Waterproof membrane shall be installed on sloped mortar to provide minimum slope to drains as required by the manufacturer's written installation instructions.
- C. Marble Sills at Restroom Floors: Complying with Marble Institute of America (MIA) with not less than a minimum abrasion-hardness value of 10 per ASTM C241.
1. Marble: Shall be thickness as shown on Drawings, "China White Elegance", free of defects and shaped to sizes indicated on the Drawings. Exposed surfaces shall have polished finish; surfaces in contact with setting bed shall be honed. Outstanding corners to have 1/4 inch bevel and outstanding edges to have 1/16 inch bevel.
 - a. Marble sills will be provided in single piece lengths for each area of installation.
 - b. Matched Marble: Provide matched marble from a single quarry for each type, variety, color, and in quantities required for work as shown and/or indicated.
 2. Mortar: ASTM C270, Type S, approximately 3:1:11 mix of Portland cement, lime and sand.
 - a. Cement: ASTM C150 except not more than 0.03 percent water soluble alkali per ASTM C91.
 - b. Lime: Hydrated, ASTM C207, Type S.
 - c. Sand: ASTM C114.
 3. Basis of Design: Adhesive shall be latex-modified thin set mortar like Laticrete 211/4237 material as produced by Laticrete International Company of Bethany, CT.
- D. Expansion Joints (if required):
1. If not indicated on the Drawings, expansion joints shall be installed in accordance with the Tile Council of America, Inc., Handbook for Ceramic Tile Installation, latest edition, as follows:
 - a. Interior: 24' to 36' in each direction.
 - b. Exterior: 12' to 16' in each direction.
 - c. Interior tilework exposed to direct sunlight or moisture: 12' to 16' in each direction.
 - d. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials.
 - e. All expansion, control, construction, cold and seismic joints in the structure shall continue through the tilework including such joints at vertical surfaces.
 - f. Joints through tilework directly over structural joints shall never be narrower than the structural joint.
- 2.8 CLEAVAGE MEMBRANE (if required)
- A. Cleavage membrane shall comply with ANSI A108.1. One layer of 15# felts, with 3" overlaps at all seams.
- 2.9 REINFORCING (if required)
- A. Reinforcing shall comply with ANSI A108.1. 2" square mesh, fine reinforcing as recommended by the tile manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Before installing tile, inspect new surfaces which are to receive tile covering. Notify the Architect in writing of defects or conditions that will interfere with or prevent a satisfactory tile installation. Do not proceed with installation until such defects or conditions have been corrected.
- B. The starting of installation in a room or space shall imply acceptance of the surfaces to receive the tile in that space.

3.2 LAYOUT

- A. Determine locations of movement joints before starting tilework.
- B. Lay out tile work so as to minimize cuts less than one-half tile in size.
- C. Locate cuts in both walls and floors so as to be least conspicuous.
- D. Lay out tile wainscots to next full tile beyond dimensions shown.
- E. Align wall joints to give straight, uniform grout lines, plumb and level.
- F. Align floor joints to give straight uniform grout lines parallel with walls.
- G. Make joints between tile sheets same width as joints within sheets so extent of each sheet is not apparent in finished Work.
- H. Grout joints at quarry tile: $\frac{1}{4}$ inch (unless otherwise indicated on the Drawings)

3.3 WORKMANSHIP

- A. Supply first-class Workmanship in tile work.
- B. Use products in strict accordance with recommendations and directions of manufacturer.
- C. Proportion mixes in accordance with latest ANSI standard specifications.
- D. Smooth exposed cut edges.
- E. Be sure cut edges are clean before installing tiles.
- F. Fit tile carefully against trim and accessories, also around pipes, electrical boxes, and other built-in fixtures so that escutcheons, plates, and collars will completely overlap cut edges.
- G. When using glazed tile sheets, minimize tearing sheets apart by drilling pipe holes as much as possible.
- H. Be sure tile Work is free of grout film upon completion.

3.4 SETTING METHODS

- A. Method and typical detailing for tile Work shall be in accordance with the following TCNA

alpha- numeric method, listing from the "Handbook for Ceramic Tile Installation" by the Tile Council of North America.

B. Tile System Schedule

1. Toilet Floors – Slab on Grade:
 - a. Ceramic Tile Floor (CFT), Thin Set F115-02, ANSI A108.5, Epoxy Grout ANSI 108.6
2. Toilet Floors – Supported Structure
 - a. Ceramic Tile Floor (CFT), Thin Set F122-02, ANSI A108.5, Epoxy Grout ANSI 108.6
3. Shower Floors
 - a. Glazed and Unglazed Ceramic Tile (CMT), Mud Set (slope to drain) F112-02, ANSI A108.1, Latex Portland Cement ANSI 118.7
4. Ceramic Tile Walls
 - a. Glazed Ceramic Wall Tile (CWT), Thin Set W202, W244 or W245, ANSI A118.7, Latex Portland Cement ANSI 118.7

C. Sound each tile after set. Replace all hollow sounding tile.

3.5 GROUTING

- A. Epoxy Grouting shall be installed in accordance with ANSI A108.6 for epoxy and the manufacturer's recommended procedures and precautions during application and cleaning.
- B. Rinse tilework thoroughly with clean water before and after using chemical cleaners.

3.6 PROTECTION

- A. The Contractor shall make such provisions as necessary to protect the tile against damage of any kind after installation. Damaged tile that appears in the finish work before turning the building over to the Owner is to be repaired or replaced by the Contractor without further cost to the Owner. Protect adjoining areas and surfaces and clean up everything at completion. Remove scrap, debris, and surplus material as it accumulates.

3.7 WATERPROOFING MEMBRANES (if required)

- A. Install in strict accordance with manufacturer's written installation instructions.
- B. Waterproof membrane shall be installed on sloped mortar to provide minimum slope to drains as required by the manufacturer's written installation instructions.
- C. Use only qualified skilled workman to install the waterproofing membrane.
- D. Examine the substrates, drains, and clamping devices to verify that they are in a condition ready to receive the membrane with no deficiency that could result in a potentially defective installation. All surfaces to be protected shall be clean, reasonably smooth and free of cracks, holes or sharp projections.
- E. Upon completion of work, test for leaks by plugging the drain or damming areas and filling with water. Inspect for leakage. Make necessary adjustments to stop all leakage and re-test

until watertight, before mortar bed is installed.

3.8 MARBLE SILLS

- A. Trowel a full bed of mortar allow to cure for a minimum of 3 days. Do not apply adhesive until grout bed is totally dried out.
- B. Spot-apply adhesive generously enough to achieve full contact when stool is pressed into level and true position.
- C. Bed seal perimeter joints at walls with mildew-resistant silicone sealant.
- D. At the completion of setting, marble work shall be thoroughly washed down using a stiff bristle brush or synthetic 3M finishing pads, nonfat detergent, and water. Absolutely no acid is to be used.

END OF SECTION 09 30 00

SECTION 09 51 23 – ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete installation of acoustical ceilings and related items indicated on Drawings and specified herein.
- B. Review "Reflected Ceiling Plan" and Mechanical and Electrical Drawings for type of material, layout, and pattern of acoustical units, location of recessed light fixtures, ceiling diffusers and grilles, details of suspension system, details at change of level, details at ceiling penetrations, details of fire rated acoustical treatment, access doors, special edge treatment, and necessary connections to work of other trades.

1.3 REFERENCES

- A. American Society for Testing and Materials
 - 1. ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - 2. ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - 3. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 4. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 6. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 7. ASTM E1264 Standard Classification for Acoustical Ceiling Products.
 - 8. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 9. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.4 SUBMITTALS

- A. Product Data: For each type of product specified.
 - 1. Include Ceiling Attenuation Class (CAC minimum of 35), Ceiling Sound Absorption (ASTM C423; NRC minimum of 0.50), Surface Burning Characteristics per ASTM E84, and compliance with ASTM E1264 for Class A products with a Flame Spread of 25 or less and Smoke Development of 50 or less.
- B. Coordination Drawings: Reflected ceiling plans to scale, showing the following:

1. Ceiling suspension members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules.
 4. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinkler heads; and special moldings at walls, column penetrations, and other junctures with adjoining construction.
 5. Acoustical test data.
- C. Samples: Each type of exposed finish required. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.
- D. Certifications:
1. Qualification data for firms and persons specified in "Quality Assurance" Article. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.
 2. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that show compliance of acoustical ceiling system and components with building code in effect for Project.
 3. Product test reports from qualified independent testing laboratory that are based on it's testing of current products for compliance of acoustical ceiling systems and components with requirements.
 4. Statement by the manufacturer that particular product submitted is approved for use in specified fire-rated ceiling assembly.
 5. Commissioning Statement of Compliance
- E. Minutes: Submit pre-installation conference meeting minutes as specified herein.
- F. Warranty: Submit manufacturer's warranty requirements for products to be provided in work.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: Employ only licensed Sub-Contractors skilled in successful installations of the specified products on comparable projects for a minimum of 5 years.
- B. Manufacturer's Qualifications: Employ only manufacturers making the specified products as a regular and current production item.
- C. Fire Performance Characteristics: Provide acoustical ceilings that are identical to those tested for the following fire performance characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E1264 for Class A products and shall have a U.L. label.
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 50 or less.
- D. Single-Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

- E. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- F. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components, and partition system.
 - 1. Coordinate color of all electrical and mechanical devices in ceilings to match ceiling color.
- G. Pre-Installation Conference:
 - 1. Immediately before the installation of the ceiling grid, the Architect, in concert with Owner, shall schedule a meeting with the General Contractor, Ceiling Sub-Contractor and Mechanical and Electrical Contractors for the purpose of reviewing all elements necessary for a complete above-ceiling installation. All deficiencies shall be noted and corrective action taken before the installation of the grid.
 - 2. Also include discussion regarding Project scheduling, procedures to be employed, grid layout with respect to the Architect's Reflected Ceiling Plan and any perceived conflicts.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.
- D. Packages required under this Section shall be properly marked on the outside with the identification of the materials contained in the package, so that they may be readily identified with the location to be used.

1.7 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.8 PERFORMANCE REQUIREMENTS

- A. General Requirements: Provide units that comply with the following:
 - A. General Product Performance for Acoustical Ceiling Units:
 - 1. ASTM E1264.
 - 2. Federal Specifications SS-S-118B.
 - 3. Units shall include manufacturer's humidity resistance treatment/properties.

- B. Abuse Resistance: Where specified, ceiling panels shall be provided and held in-place with hold-down clips.
- C. General Suspension System Materials, Performance and Testing: ASTM C635.
- D. Suspension System Lay-In Panel Installation: ASTM E636.
- E. Panel Clips: Provide clips spaced at 24 inches o.c. on all cross tees in areas subject to excessive room pressure, rooms subject to vandalism, vestibules smaller than 200 sq. ft., and all fire-rated assemblies in accordance with U.L. requirements.
- F. Test Method for Mold Growth on Interior Coating: ASTM D3273.

1.9 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's warranty that the ceiling panels and suspension systems shall be free from sagging or warping for indicated warranty.
 - 1. Warranty Period: Not less than 15 years from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Ceiling Panel Manufacturers: Products of the following manufacturers are acceptable providing they meet or exceed the requirements and specifications of the specified product:
 - 1. Basis of Design: Armstrong World Industries. Approved Equivalent Product Manufacturers, subject to compliance with Division 01, Product Requirements.
 - 2. CertainTeed Ceilings, Inc.,
 - 3. USG Interior Systems

2.2 MATERIALS

- A. Acoustical Ceiling Tile: Manufacturer's standard, factory-applied, washable latex paint finish unless otherwise noted, and complying with the following:
 - 1. Standard Size: 2' x 2'
 - 2. Color: White unless otherwise indicated on Reflected Ceiling Plans.
 - 3. Panel Schedule:
 - a. General Purpose, Office, Conference, Break and Bunk Rooms
 - i. AWI Fine Fissured, Square Lay-in 1728
 - b. Toilet, Shower, Locker Rooms and Kitchen (Moisture resistant)
 - i. AWI Shasta, Non – Perforated 2905
- B. Linear Metal Ceiling Panel: Manufacturer's standard, factory-applied, washable paint finish unless otherwise noted, and complying with the following:
 - 1. Standard Size: 96" x 8" x 5/8" Microperforated
 - 2. Color: Silver Gray, unless otherwise indicated on Room Finish Schedule.
- C. Suspension and Acoustical Lay-In System:
 - 1. Suspension systems shall meet or exceed the requirements of ASTM C635 for dimensional tolerances, coatings and finishes, and load carrying capabilities. Individual component deflection shall not exceed 1/360 of the span.
 - a. Acoustical Ceiling Tiles Grid: Snap grid with 15/16" pre-painted white

- baked-on paint face.
- b. Metal Linear Panels Grid: Concealed carrier, with black contrast filler strip, molding, pressure springs, trim and clips.
- 2. Finishes and Colors:
 - a. Hot-dipped galvanized (G-30 minimum) on all ceiling suspension components. Exposed surfaces of suspension system components shall receive white baked-on enamel paint.
 - b. High-Humidity Finish: Acoustical Ceiling Tiles Grid: Snap grid with 15/16" aluminum pre-painted white face. Comply with ASTM C635 requirements for "Coating Classification for Severe Environment Performance." Unless otherwise noted provide at Toilet, Shower, Locker Room and Kitchen areas.
- 3. Suspension System Manufacturers: Products of the following manufacturers are acceptable providing they meet or exceed the requirements and specifications of the specified product:
 - a. Armstrong World Industries
 - b. Chicago Metallic Corp
 - c. USG Interior Systems
- D. Wall Channel: Hemmed edge type.
- E. Rough Suspension Materials
 - 1. Metal Channel Runners: 1-1/2", 475 pounds per thousand lineal feet and 3/4", 300 pounds, per thousand lineal feet, cold rolled painted channels.
 - 2. Hanger and Tie Wire: Not less than 12 gauge galvanized soft annealed steel.
- F. Attachment Devices: Size for 10 times design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.
 - 1. Cast-In-Place and Post-installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attachment of hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.
 - a. Cast-in-place anchors.
 - b. Chemical anchors.
 - c. Expansion anchors.
 - d. Undercut anchors.
 - 2. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attachment of hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190, conducted by a qualified testing laboratory.
- G. Sealant Materials: Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified in Section 07 - Joint Sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which ceiling system attaches and abuts. Do not

proceed with installation until unsatisfactory conditions have been corrected.

- B. Above Ceiling Observation: Conduct an above ceiling observation before start of acoustical ceiling installation and report all deficiencies observed. Do not start work until unsatisfactory conditions have been corrected in an acceptable manner.
1. Notify Architect not less than one week in advance of date and time when the Project, or part of the Project, will be ready for an above ceiling observation.
 2. Before notifying Architect, complete the following in areas to receive acoustical ceiling units:
 - a. Installation of 80% of the lighting fixtures, powered for operation.
 - b. Installation of insulation and leak and pressure testing of water piping systems.
 - c. Installation of air duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control air tubing.
 - f. Firestopping of penetrations, joints, and perimeters in smoke barriers and other compartmentalized areas.
 - g. Smoke sealing of penetrations, joints, and perimeters in smoke barriers and other compartmentalized areas.
 - h. Installation of ceiling suspension system.
 3. Check installation against samples provided and reflected ceiling plan schedules.
 4. No ceiling panel installation shall be performed until spaces are enclosed and dry, and all above ceiling work has been completed.

3.2 PREPARATION

- A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half-width units at borders, and comply with reflected ceiling plans.
- C. Refer to Room Finish Schedule and Legend for spaces to receive acoustical ceiling tile. Grid shall be laid out and coordinated for lighting fixtures and mechanical system items.
- D. Application of acoustical treatment shall be done by the manufacturer or his authorized applicator and in strict accordance with the manufacturer's specifications, except as herein modified.
- E. The installation of the ceiling shall be done before the installation of shelving, built-in counters, and finished floors; but after the other work in the room has been completed, including painting, unless otherwise approved by the Architect.
- F. Install ceiling panels only after building HVAC system has been run continuously for 72 hours.

3.3 INSTALLATION

- A. Install suspension wires 4 foot on centers, maximum, both directions. Secure suspension hangers to building structure above. For lighting fixtures install hanger wires to runners at all four corners of fixtures. Do not attach hanger wire to metal roof deck, electrical, or mechanical

equipment or related support systems.

- B. Install metal channel by saddle tying hanger wire or with leveling clips to a leveling tolerance of 1/8" in 12 feet each way.
- C. Install grid suspension system in strict accordance with the manufacturer's recommendations. No exposed fasteners, including pop rivets are allowed.
- D. Install wall angle at intersection of suspended ceiling and vertical surfaces.
- E. Install acoustical units in a true and even plane, in straight line courses following lay out pattern shown in reflective ceiling plan. Border tile shall not be less than 6" wide to the greatest extent possible. Fit border units neatly against vertical surfaces.
- F. Seal joints in acoustical units around pipes, ducts, and electrical outlets with caulking compound.
- G. Just before final acceptance, remove and replace skinned, damaged, or dirty panels.
- H. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
 - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
 - 2. Screw-attach moldings to substrate at intervals not over 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.

3.4 FIELD QUALITY CONTROL

- A. At completion of work, installation shall comply with ASTM C635 for dimensional tolerances, coatings, and finishes and load carrying capacities and with the following:
 - 1. Ceilings shall be level with maximum tolerance of 1/8 inch per 10 ft; discolored, broken or pierced ceiling panels shall be replaced.
 - 2. Suspension system shall be uniform in appearance; main runners shall be installed square and firmly interlocked with one another and shall be tightly secured to hangers; hangers shall not be kinked or bent to level ceiling grid; hangers shall only be attached to structural units; additional fixture loads shall require additional hanger supports to avoid deflection or rotation.
 - 3. Remove all trash, tools, and debris resulting from work of this Section.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 23

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SECTION 09 65 19 –RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete resilient flooring work, including accessories as indicated and as specified herein; including but not limited to, the following:
 - 1. Luxury Vinyl Tile Plank
 - 2. Vinyl Coved Base

1.3 SUBMITTALS

- A. Product Data: Submit technical data on each item specified including certification by tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
- B. Product Certificates: In lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.
- C. Samples: Manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors and patterns available for each type of resilient floor tile indicated.
- D. Test Results: Submit results from calcium chloride and bond and moisture tests as specified herein, before installation of resilient flooring.
- E. Installer Statement of Compliance: Certify resilient flooring is installed in accordance with manufacturer's installation manual in order to validate the manufacturer's warranty on installation integrity.
- F. Maintenance Data: Submit maintenance manuals for flooring materials provided to be included in Operation and Maintenance Manuals.
- G. Warranty: Submit sample of warranty
- H. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

- b. Low-Emitting Materials: Provide data for each flooring product used. Confirm that each product contains no urea formaldehyde.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Floor Tile: Obtain each type, color, and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Installer's Qualifications: Employ only authorized representative of resilient flooring manufacturer for installation and maintenance of units required for this Project.
 - 1. Employ only experienced Contractors (Installers) skilled in the successful installation of the specified materials and accessories on similar projects for a minimum of five years.
- C. Manufacturer's Qualifications: A firm experienced in manufacturing products or systems 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. Fire Performance Characteristics: Provide resilient floor tile with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E648.
 - 2. Smoke Density: Less than 450 per ASTM E662.
 - 3. Flame Spread: Less than 75 per ASTM E84.
- E. Calcium Chloride Test: Contractor shall provide a calcium chloride test to measure moisture vapor emissions from the concrete slab on grade, before the installation of the resilient flooring. Maximum moisture emissions levels shall be as recommended by the resilient flooring manufacturer.
- F. Bond and Moisture Tests: Contractor shall provide bond and moisture tests before the installation of the resilient flooring. Bond and moisture tests shall be in strict accordance with the resilient flooring manufacturer's recommendations. Provide number of tests as recommended by the resilient flooring manufacturer.
 - 1. Test concrete slabs in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride to ensure emission of no more than 3 lbs of water/1000 sf of slab in 24-hour period.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F and 90 deg F.
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be

installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F in spaces to receive tiles for at least 48 hours before installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F.
- B. Do not install tiles until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during tile installation.

1.7 SEQUENCING AND SCHEDULING

- A. Specified items shall not be delivered or installed until building is enclosed, wet work completed and HVAC system is operating and maintaining temperature and humidity at occupancy level during remainder of construction period.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

1.8 EXTRA MATERIALS

- A. Furnish to Owner, not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.

1.9 WARRANTY

- A. Manufacturer's Warranty covering manufacturing defects and installation integrity shall be indicated warranty period. Installation integrity is defined as products installed in accordance with the manufacturer's installation manual.
 - 1. Warranty Period: Not less than 5 years from Date of Substantial Completion.

Installer's Warranty: Fully guarantee installation of resilient flooring and wall base against defects in installation, workmanship and loss of adhesion for indicated warranty period.

- 2. Warranty Period: Not less than 2 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. LUXURY VINYL PLANK:
 - 1. Basis of Design: Mannington Commercial, (See Room Finish Schedule)
 - 2. Approved Equivalent Product Manufacturers are listed below subject to approval in compliance with Division 01, Section -Product Requirements
 - 3. Armstrong Commercial Floors;
 - 4. Azrock Commercial Flooring;
 - 5. Tarkett Inc
- B. Vinyl Base:

1. Basis of Design: Mannington Commercial
2. Approved Equivalent Product Manufacturers are listed below subject to approval in compliance with Division 01, Section -Product Requirements
3. Armstrong Commercial Floors,
4. Johnsonite
5. Marley Flexco (USA), Inc
6. Roppe Corporation
7. Nora Rubber Flooring

2.2 TILE AND ACCESSORIES

- A. Luxury Vinyl Plank: 4 inch by 36 inch by .096" inch.
 1. Patterns and colors as selected by the Architect.
- B. Edge Reducing Strips: Beveled one inch to 1-1/2 inch wide by 1/8 inch thick of vinyl or rubber, same manufacturer as tile; colors as selected by Architect. Use where meeting unfinished floor or flooring of different material.

2.3 RESILIENT BASE

- A. Vinyl Cove Base:
 1. Comply with ASTM F1861 Standard Specification for Resilient Wall Base.
 2. 4 inch high roll stock, 1/8 inch thick, Type TV, vinyl; Group 1, solid (homogeneous); Style B, coved.
 3. Provide molded corners 4 inches in height by 4 inches in length each way for external corners.
 4. Coiled length straight sections.
- B. Patterns and colors shall be as selected by Architect. (See Room Finish Schedule).

2.4 MISCELLANEOUS MATERIALS

- A. Adhesive: Type as recommended by product manufacturer. Water based adhesives are not allowed.
- B. Trowelable Leveling and Patching Compounds. Latex-modified, Portland cement based or blended hydraulic-cement-based formulation or approved by manufacturer for applications indicated, as required to level uneven subfloor conditions
- C. Floor Stripper: Flooring manufacturer's standard floor stripper used to remove floor finishes, dirt, grime, oil, stains, tar, gum adhesives and scuffmarks.

3.1 EXAMINATION

- A. Examine areas where installation of resilient flooring will occur, with Installer present. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.

2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section Cast-In-Place Concrete for slabs receiving resilient flooring.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

3.2 PREPARATION

- A. Comply with manufacturer's installation specifications to prepare substrates to receive resilient flooring. Including moisture testing.
- B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by resilient flooring immediately before installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, before applying adhesive. Apply according to manufacturer's directions.
- F. When installing resilient flooring over fiber reinforced concrete, the fibers will either have to be ground off or level the slab with cementitious underlayment. Exposed reinforcing fibers are considered matter that will adversely affect the appearance of the installed resilient flooring.
- G. Do not install floor tiles until they are the same temperature as space where they are to be installed.

3.3 INSTALLATION

- A. Comply with floor manufacturer's installation directions and other requirements indicated that are applicable to each type of floor installation included in Project.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width, unless noted otherwise Adjust to avoid using cut widths at perimeter that equal less than one-half of a tile, unless noted otherwise Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 1. Lay tiles in pattern with respect to location of colors, patterns, and sizes as indicated on Drawings.
- D. Scribe, cut, and fit to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

- E. Extend floor into toe spaces, door reveals, closets, and similar openings. Extend floor to center of door openings.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
- G. Install tiles on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.
- I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times. Spray applied adhesives are not allowed.
- J. Hand roll floor where required by the manufacturer.
- K. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Install preformed corners before installing straight pieces.

3.4 FIELD QUALITY CONTROL

- A. Substrate Preparation: In strict accordance with manufacturer's written recommendations.
 - 1. Perform moisture tests as recommended by manufacturer. Proceed with installation only after substrates pass tests.
 - 2. Fill cracks, holes and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform, level, smooth surface.
 - 3. Sweep and vacuum clean surfaces to be covered immediately before start of installation.
 - 4. If resilient flooring shall be installed over fiber-reinforced concrete, fibers shall either be ground off or slab shall be leveled with cementitious underlayment.
 - a. Exposed reinforcing fibers are considered a detriment and will not be permitted as they may adversely affect the appearance of the installed resilient flooring.
 - 5. Do not install resilient flooring until products are the same temperature as the spaces that they are indicated to be installed.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations after completing tile installation:

1. Allow adhesive to dry for 48 hours after installation.
 2. Remove visible adhesive and other surface blemishes using cleaner recommended by floor manufacturer.
 3. Sweep or vacuum floor thoroughly.
 4. Do not wash floor until after time period recommended by resilient floor manufacturer.
 5. Damp-mop surfaces with neutral detergent solution while machine scrubbing to remove soil marks.
 6. Pick up spent solution with mop or wet vacuum as soon as each floor section has been stripped. Do not allow solution to dry. Rinse thoroughly with clear water. Allow floor to dry thoroughly before applying floor finish.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended by tile manufacturer or if not recommended, use ¼-inch thick corrugated cardboard, securing to floor surfaces with “3M” tape. Maintain integrity of covered areas until resilient flooring is ready for Substantial Completion.
- C. No more than four (4) days before scheduled Substantial Completion, remove all temporary and protective covering from floor surfaces.

END OF SECTION 09 65 19

SECTION 09 65 20 –RESILIENT WALL BASE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete work, including accessories as indicated and as specified herein; including but not limited to, the following:
 - 1. Vinyl Coved Base

1.3 SUBMITTALS

- A. Product Data: Submit technical data on each item specified including certification by manufacturer that products supplied for installation comply with SREF and local regulations controlling use of low volatile organic compounds (VOC's).
- B. Product Certificates: In lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.
- C. Samples: Manufacturer's color charts consisting of actual base showing full range of colors and patterns available for each type indicated.
- D. Test Results: Submit results from calcium chloride and bond and moisture tests as specified herein, before installation of flooring and wall base.
- E. Installer Statement of Compliance: Certify wall base is installed in accordance with manufacturer's installation manual in order to validate the manufacturer's warranty on installation integrity.
- F. Maintenance Data: Submit maintenance manuals for materials provided to be included in Operation and Maintenance Manuals.
- G. Warranty: Submit sample of warranty.
- H. Extra Materials: 1% of each type, color and pattern installed.
- I. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each

- interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.
- b. Low-Emitting Materials: Provide data for each flooring product used. Confirm that each product contains no urea formaldehyde.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for wall base: Obtain each type, color, and pattern from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Installer's Qualifications: Employ only authorized representative of manufacturer for installation and maintenance of units required for this Project.
 1. Employ only experienced Contractors (Installers) skilled in the successful installation of the specified materials and accessories on similar projects for a minimum of three years.
- C. Manufacturer's Qualifications: A firm experienced in manufacturing products or systems 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. Fire Performance Characteristics: Provide resilient base with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E648.
 2. Smoke Density: Less than 450 per ASTM E662.
 3. Flame Spread: Less than 75 per ASTM E84.
- E. Calcium Chloride Test: Contractor shall provide a calcium chloride test to measure moisture vapor emissions from the concrete slab on grade, before the installation of the flooring and wall base. Maximum moisture emissions levels shall be as recommended by the manufacturers.
- F. Bond and Moisture Tests: Contractor shall provide bond and moisture tests before the installation of the flooring and wall base. Bond and moisture tests shall be in strict accordance with the manufacturer's recommendations. Provide number of tests as recommended by the flooring manufacturer.
 1. Test concrete slabs in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride to ensure emission of no more than 3 lbs of water/1000 sf of slab in 24-hour period.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall base and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store wall base materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F and 90 deg F.

- C. Store on flat surfaces. Move wall base installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F in spaces to receive floor and wall base for at least 48 hours before installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F.
- B. Do not install materials until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during tile installation.

1.7 SEQUENCING AND SCHEDULING

- A. Specified items shall not be delivered or installed until building is enclosed, wet work completed and HVAC system is operating and maintaining temperature and humidity at occupancy level during remainder of construction period.
- B. Do not install floors over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

1.8 EXTRA MATERIALS

- A. Furnish to Owner 1% of each class, wearing surface, color, pattern and size of wall base installed.

1.9 WARRANTY

- A. Manufacturer's Warranty covering manufacturing defects and installation integrity shall be indicated warranty period. Installation integrity is defined as products installed in accordance with the manufacturer's installation manual.
 - 1. Warranty Period: Not less than 5 years from Date of Substantial Completion.

Installer's Warranty: Fully guarantee installation of flooring and wall base against defects in installation, workmanship and loss of adhesion for indicated warranty period.

- 2. Warranty Period: Not less than 2 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTACLE PRODUCTS AND MANUFACTURERS

- A. Vinyl Base:
 - 1. Mannington Commercial, (Basis of Design: See Room Finish Schedule)
 - 2. Armstrong Commercial Floors,
 - 3. Johnsonite
 - 4. Marley Flexco (USA), Inc
 - 5. Roppe Corporation
 - 6. Nora Rubber Flooring

2.2 ACCESSORIES

- A. Edge Reducing Strips: Beveled one inch to 1-1/2 inch wide by 1/8 inch thick of vinyl or rubber, same manufacturer as wall base, colors as selected by Architect. Use for transitions of different flooring material (where indicated on drawings).

2.3 RESILIENT BASE

- A. Vinyl Cove Base:
 1. Comply with ASTM F1861 Standard Specification for Resilient Wall Base.
 2. 4 inch high roll stock, 1/8 inch thick, Type TV, vinyl; Group 1, solid (homogeneous); Style B, coved.
 3. Provide molded corners 4 inches in height by 4 inches in length each way for external corners.
 4. Coiled length straight sections.
- B. Patterns and colors shall be as selected by Architect.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesive: Type as recommended by product manufacturer. Water based adhesives are not allowed.
- B. Trowelable Leveling and Patching Compounds. Latex-modified, Portland cement based or blended hydraulic-cement-based formulation or approved by manufacturer for applications indicated, as required to level uneven subfloor conditions

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas where installation of flooring and wall base will occur, with Installer present. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by floor manufacturer.
 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section Cast-In-Place Concrete for slabs receiving resilient flooring.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

3.2 PREPARATION

- A. Comply with manufacturer's installation specifications to prepare substrates to receive flooring and wall base. Including moisture testing.
- B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks,

holes, and depressions in substrates.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring and wall base adhesives.
- D. Broom or vacuum clean substrates to be covered by flooring and wall base immediately before installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Do not install floor or wall base until they are the same temperature as space where they are to be installed.

3.3 INSTALLATION

- A. Comply with manufacturer's installation directions and other requirements.
- B. Scribe, cut, and fit to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- C. Extend wall base into toe spaces, door reveals, closets, and similar openings.
- D. Adhere wall base to substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
- E. Use full spread of adhesive applied to substrate in compliance with manufacturer's directions including those for adhesive mixing, and adhesive open and working times. Spray applied adhesives are not allowed.
- F. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Install preformed corners before installing straight pieces.

3.4 FIELD QUALITY CONTROL

- A. Substrate Preparation: In strict accordance with manufacturers' written recommendations.
 - 1. Perform moisture tests as recommended by manufacturer. Proceed with installation only after substrates pass tests.
 - 2. Fill cracks, holes and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform, level, smooth surface.
 - 3. Sweep and vacuum clean surfaces to be covered immediately before start of installation.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations after completing installation:
 - 1. Allow adhesive to dry for 48 hours after installation.

2. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturer.
 3. Sweep or vacuum floor thoroughly.
 4. Do not wash wall base until after time period recommended by manufacturer.
- B. Protect flooring and wall base against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended by manufacturer until Substantial Completion.

END OF SECTION 09 65 20

SECTION 09 68 13 – TILE CARPETING

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 carpet tile and installation.
- B. Related Sections include the following:
 - 1. Section 09, Resilient Wall Base for resilient wall base and accessories installed with carpet tile.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation methods.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of installation.
 - 4. Pattern of installation.
 - 5. Pattern type, location, and direction.
 - 6. Type, color, and location of insets and borders.
 - 7. Type, color, and location of edge, transition, and other accessory strips.
 - 8. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Two Full-size samples.
 - 2. Exposed Edge Stripping and Accessory: 12-inch long Samples.
- D. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.
- E. Maintenance Data: For carpet tile to include in maintenance manuals specified in Division 01. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
 - 3. Carpet tile manufacturer shall provide a representative to demonstrate cleaning and various kind of stain removal processes to Owner maintenance personnel before Substantial Completion.

- F. Submittal Requirements:
1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer’s product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements and has successfully installed similar products to those required as work of this Project for not less than five (5) years.
1. Additional Installer Qualifications: Carpet tile manufacturer shall provide written approval to Owner that installer is an approved installer for all carpet tile materials specified on this project.
- B. Contractor Qualifications: Employ only experienced Contractors (Installers) skilled in the successful installation of specified materials and assemblies on similar projects for not less than five (5) years. Installers shall be state certified or licensed subcontractors.
- C. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Industry Standards: Comply with the following:
1. NFPA 253.
 2. Floor Covering Installation Board (FCIB).
 3. Carpet and Rug Institute (CRI).
 4. Floor Covering Installation Contractor’s Association.
- E. Mockups: Before installing carpet tile, install mockups for each type of carpet tile installation required to demonstrate aesthetic effects and qualities of materials and execution. Install mockups to comply with the following requirements, using materials indicated for the completed Work:
1. Install mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be installed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Remove mockups when directed.
 7. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.
- F. Single Source Limitations: Provide carpet tile from one manufacturer through a single source for entire work of Project unless otherwise shown and/or indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."
- B. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tile, install carpet tile before installing these items.

1.7 WARRANTY

- A. General Warranty: Special warranty 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.
1. Special Carpet Tile Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, snags, runs, yarn loss by weight of normal use, edge raveling, runs, loss of tuft bind strength, dimensional stability, excess static discharge, delamination and stain resistance.
 2. Warranty Period: Fifteen (15) years from Date of Substantial Completion.
- B. Installer's Warranty: Contractor (Installer) shall fully guarantee installation against defects in materials, workmanship, seaming, and loss of adhesion for indicated warranty period.
1. During warranty period, Installer shall repair or replace all defective areas as directed and at no cost to the Owner.
 2. Warranty Period: Not less than 2 years from Date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units equal to 1 percent of amount installed for each type, color and pattern furnished.
 2. Attic stock shall be designated for use by Owner only after completion of Project and shall not be used for repair or replacement during warranty period.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Acceptable Manufacturers:

1. Basis of Design: Mannington (See Room Finish Schedule)
2. Approved Equivalent Product Manufacturers are listed below subject to approval in compliance with Division 01, Section -Product Requirements
3. Collins & Aikman (C&A) Tاندus Floor Coverings
4. Interface Flooring Systems, Inc.
5. Lee's Carpets
6. Milliken
7. Shaw Contract Group

B. Product Description:

1. Fiber Content: 100% nylon Type 6,6
2. Fiber Type: Branded type, Invista®, Solutia®, Universal®
3. Dye Method: Yarn dyed or solution dyed. Pile Characteristics: Tufted level loop or textured level loop.
4. Gage: 1/10 minimum.
5. Pile Density: 6000 oz/cy (+/- 5% industry standard).
6. Surface Pile Weight: 18 oz./sq. yd. minimum.
7. Size: Approximately 18" by 18" to 36" x 36" square.
8. Stitches per Inch: 8.00" minimum.
9. Backing System: Manufacturer's standard vinyl or thermoplastic hard-backed or integral- cushion thermoplastic backing system, recyclable content, maintaining a 100% true moisture barrier between secondary backing and the floor substrate below, passing the British Spill Test, Method E. Pre-adhered backing system may be used as an alternate without an applied releasable adhesive to surface substrate.
10. Mergeability: Carpet tiles shall be non-directional with mergeable dye lots. Tile carpeting that is of the same style/color but from different dye lots and/or manufacturing dates, may be merged and used interchangeably, both at initial installation and at later selective replacement to create a continuous, carpeted surface with no tile appearing out-of-place.

C. Performance Characteristics: As follows:

1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
2. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165, per AATCC- 165.
3. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC- 16.
4. Stain Resistance: Must pass Acid Red 40 spot test AATCC-175 with an 8 or better.
5. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria; not less than 1-mm halo of inhibition for gram-negative bacteria; no fungal growth; per AATCC-174. Part II; AATCC 138 Washed; AATCC 174 Parts 2 & 3. (If used, provide OCPS with independent test certification(s) [i.e. EPA etc.] that states use of antimicrobial treatment is in compliance with all governmental regulations, including AATC specifications stated in this paragraph, regarding its use within the complete carpet tile construction/assembly.
6. Dimensional Stability: (Aachen Method Din 54318) < or = 0.2% or less per ISO 2551.
7. Smoke Density < or = 450 flaming.
8. Static Generation: AATCC 134 w/neolite < or = 2.5KV at 20% r.h.
9. Flame Spread and Flammability: Minimum critical radiant flux of 0.22

watts/sq.cm; NFPA 253. Flammability shall meet Flammability Standards CPSC FF 1-70; ASTM D2959-70T (Methenamine Pill Test).

10. Random Installation Method: All tile carpeting shall be designed for random installation which means that each and every carpet tile must be capable of being installed in any of the four (4) possible directions without regard to pile direction, pattern or orientation of any adjacent tiles while still creating a finished carpet tile assembly that appears as a finished carpet tile installation which is visually continuous and has no apparent appearance of out-of-place or improperly positioned tiles.
- D. Indoor Air Quality: Carpet tile and adhesive shall be CRI Green Label certified by published class (product type) and certification number.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, antimicrobial agent, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and that is recommended by carpet tile manufacturer.
 1. VOC Limits: ASTM D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products for carpet tile and adhesives.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Verify that substrates and conditions are satisfactory for carpet tile installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
 2. Subfloor finishes comply with requirements specified in Division 03 Section Cast-in- Place Concrete for slabs receiving carpet tile.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written

instructions, to fill cracks, holes, and depressions in substrates.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 13, "Carpet Modules (Tiles)."
- B. Installation Method: As recommended in writing by carpet tile manufacturer, with non-directional units and merge-able dye lots.
- C. Apply carpet tile adhesives by roller or spray method over entire surface to receive carpet tile, in accordance with carpet tile manufacturer's instructions. Allow adhesive to set and/or dry before initiation of carpet tile installation, per carpet tile manufacturer's instructions.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 15, "Protection of Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete painting and finishing work as detailed on the Drawings and as specified herein, of surfaces as scheduled throughout the building.
- B. The type of material to be used and the number of coats to be applied are listed in the "Painting Schedule" in this Section. Also, refer to Room Finish Schedule and Finish Plans.
- C. The term "paint" as used herein, includes enamels, paints, sealers, stains, fillers, emulsions, and other coatings, whether used as prime, intermediate, or finish coats.
- D. The Architect shall not be limited in the number of colors selected for single space or for the complete Project.
- E. The intent is to provide a finished building, interior and exterior, whether or not specifically indicated. Some items may not be specifically indicated to be painted, however, all items shall be finished as directed by the Architect.
- F. All exposed metals shall be painted with color as selected by the architect.

1.3 REFERENCES

- A. Work shall comply with applicable requirements of the following:
 - 1. Florida Building Code, latest edition.
 - 2. Painting and Decorating Contractors of America (PDCA).

1.4 SUBMITTALS

- A. Product Data: Data for each item specified.
- B. Materials List: Before the start of work and before paint materials are delivered to the site, submit a list of materials proposed and the equivalent specified item.
 - 1. This shall in no way be construed as permitting substitution of materials for those specified or approved for this Work by the Architect.
- C. Color Chip Catalog: Provide a current color chip catalog from which colors may be selected.
- D. Stain Samples: Submit sample of specified wood species with selected stain applied to specified wood types to Architect for approval. Resubmit additional samples as necessary to obtain color desired by Architect.

- E. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable manufacturer, submit for review the current recommended method of application published by the manufacturer.
- F. Samples of manufacturer's standard warranty for each product. Final copies to be submitted with Closeout submittal.
- G. Pre- Construction Conference Minutes.
- H. Statement of Compliance: Provide certification that the specified materials have been installed, and that they were applied to the required dry film thickness in accordance with the Contract Documents and the manufacturer's instructions.
- I Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.
 - 2. Indoor Environmental Quality – Low-Emitting Materials: Provide specific VOC data in g/L, less water format. Submittals will include MSDS sheets for each product provided.
 - a. Adhesives and Sealants: Provide manufacturer's product data for each interior sealant, adhesive, and sealant primer used on the project. Include printed statement of volatile organic compound (VOC) content.
 - b. Paints and Coatings: Provide data for paints and coatings, including printed statement of volatile organic compound (VOC) content for each product used on the project.

1.5 QUALITY ASSURANCE

- A. Qualifications of Painters: Applicators shall be licensed subcontractors in Florida skilled in successful applications of the specified products on comparable projects for a minimum of 5 years. Applicators shall be pre-qualified in writing by the Manufacturer before submission of bids. If installed painting is rejected, no allowance will be made for lack of mechanics skill.
- B. Manufacturer(s) Qualifications: Utilize only manufacturers making the specified products as a regular and current production item.
- C. Codes and Standards: In addition to complying with pertinent codes and regulations, comply with "Standard (Type 1)" as defined by the Painting and Decorating Contractors of America in their "Modern Guide to Paint Specifications," current edition.
- D. Paint materials shall be from the manufacturer's best quality commercial grade, professional coatings paint line.
- E. Environmental Standards: Approved products must meet VOC standards of Zero VOC coatings where specified, a maximum amount of VOCs of 150g/L for all Interior coatings (except WB Epoxy at 245 g/L) and 200 g/L for all Exterior coatings. Exterior Texture Coating for concrete is excluded.
 - 1. All work shall comply with applicable standards of the following:

- a. Florida Department of Environmental Protection (agency responsible for implementation of the Clean Air Act in Florida); www.dep.state.fl.us/air/programs/cleanair.htm.

F. Pre-Construction Conference:

1. Conduct a Pre-Construction Conference for the purpose of reviewing all elements necessary for the application and completion of work. All deficiencies in substrates shall be noted and corrective action taken before commencement of Work.
2. Project scheduling, phasing, area access and procedures to be employed shall also be discussed.

G. Contractor's (Applicator) Acceptance: The Applicator shall certify acceptance of all substrates before the application of any material. The certification shall state that the substrate is acceptable and ready for the scheduled finish coating application to begin and that the substrates do not exceed the allowable recommended moisture content. Do not proceed until unsatisfactory work has been corrected and accepted by applicator.

H. The Paint Manufacturer's Representative shall inspect the job and provide an approval signature at each painting phase (substrate inspection, primer coat application, first finish coat application, final finish coat application, etc...). A signed document shall be provided at Project Closeout certifying that the Manufacturer accepts the work with assurance that the Contractor has taken all the necessary steps to provide a satisfactory finished product.

1.6 FIELD QUALITY CONTROL

A. Mock-Up: Architect, in concert with Owner will designate sample room(s)/space(s) to receive representative complete finishes of each finish required.

1. When acceptable to Architect and Owner in all aspects (substrate preparation, surface moisture content, primer/filler application, finish coat application, mil thicknesses, etc.) these room(s)/space(s) will be used as quality standard for remainder of Project for all similar finishes and spaces.
2. Contractor will paint an 8' x 8' finished sample of each color to be used, for both interior and exterior colors in an area specified for that color, for Owner and Architect approval prior to purchasing the paint for the project.

1.7 PRODUCT HANDLING

A. Delivery: Deliver paint materials to the job site in their original unopened containers with labels intact and legible at time of use.

B. Protection:

1. Store only the approved materials at the job site and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
2. Use means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
3. Use means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of other trades.

1.8 EXTRA STOCK

- A. Immediately prior to Final Completion, provide Owner with a voucher to purchase paint at later date instead of getting cans of attic stock paint that will expire. Provide the Owner with a voucher equal to the amount of one gallon of each color used in each coating material used for future use.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Conform to State and local V.O.C. (Volatile Organic Compound) Regulations. Notify Architect in writing if variations to Specifications are required.
- B. Do not apply materials when the surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- C. Do not apply exterior coating during rain, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

1.10 WARRANTY

- A. Provide product warranties standard with the manufacturer of each product specified with date of warranties to begin at Substantial Completion.
 - 1. Paint Manufacturer's Warranty: In addition to other warranties, paint manufacturer shall provide product warranties standard with each product specified.
 - 2. Manufacturer shall warrant all interior and exterior paint finishes and coatings for labor and materials against cracking and fading for a minimum of ten (10) years from Date of Substantial Completion.

1.11 PROJECT CLOSEOUT

- A. Closeout Submittals: Submit final copies of manufacturer's warranties for each specified product.
- B. Corrections: Architect, in concert with the Owner, shall be the sole judge of defective work and the level of acceptability. Depending upon the gloss and texture of a particular surface, it may be necessary for the entire surface (wall exposure, ceiling, rail, trim board, etc.) to be recoated to meet acceptability standards.
- C. Contractor's Statement of Compliance: Painting subcontractor shall provide certification that the specified materials have been installed in the required number of coats, and that they were applied to the minimum coating thicknesses in accordance with Contract Documents and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Paints:
 - 1. Basis Of Design : Sherwin-Williams Company
 - 2. Duron
 - 3. Glidden Professional
 - 4. M. A. Bruder and Sons, Inc. (MAB Paints)

5. Porter Paint Company
 6. PPG Industries, Inc. (Pittsburgh Paints)
- B. Exterior Textured Coatings:
1. Sherwin-Williams Company
 2. Textured Coatings of America, Inc. (Tex-Cote)
 3. PPG Industries, Inc. (Pittsburgh Paints)
- 2.2 ALLOWABLE SUBSTITUTIONS: Products other than those named in Acceptable Manufacturers and Specific Products above may be substituted when in conformance with individual requirements stated in Division 01, "Product Requirements" and approved by Architect and Owner.

PART 3 – EXECUTION

3.1 PRODUCT SELECTION

- A. New Construction
1. Surfaces to receive initial painting shall receive a primer and two finish coats.
 2. Certain tinted colors, low hiding colors or radical color changes and, industry standards may require an additional finish coat(s).
- C. Acrylic latex Semi-Gloss shall be used for new construction on both interior and exterior metal doors and frames. Acrylic Gloss with appropriate bonding-type primer shall be used when re-painting over alkyd enamels.
- D. Semi-gloss acrylics shall be used on exterior for resistance to ultra-violet light (chalking, fading and yellowing).
- E. Paint manufacturer's representative(s) shall review and approve all paint specifications and substrates before initial paint coating application.

3.2 SURFACE PREPARATION

- B. Before starting Work, the Applicator shall certify acceptance of all substrates as herein indicated.
- C. Carefully follow the paint manufacturer's recommendations for minimum surface acceptability and the recommendations of recognized trade associations.
- D. In general, substrates shall be dry, clean and slightly rough. Surfaces to be painted shall be free of dirt, oil, release agents, grease, rust, mill scale, efflorescence, laitance and other surface imperfections and contaminants or any substance which may adversely affect the performance of the coating before the application process begins.
- E. The paint manufacturer shall assist the Paint Contractor with prearranged site visits during surface preparation or product application phases of the job to assure the quality of the work meets all plans, specifications, or applicable standards. Site Visit Reports are required for all visits to the job by Manufacturer's representatives. Any deviations to the specifications must be included in the Site Visit Report and sent to the General Contractor, Architect and Owner. The Site Visits, are to insure the manufacturers' products will be applied in the proper manner, consistent with and in accordance with label and/or data sheet directions and the

written specification established for the job. These manufacturer's Site Visit Reports are a project requirement.

- F. Inspections for pH will be required by paint manufacturer on all masonry and concrete surfaces and will be documented on approved inspection forms on the behalf of the Owner. Acceptable range shall be 8.0 pH to 9.0 pH. Surfaces will be inspected for proper pH levels before the application of any primers, sealers or paint coatings. Inspections for DFT and wet film thickness will also be required by paint manufacturer and will be documented on approved inspections forms on the behalf of the Owner.
- G. Exterior caulks and/or sealants shall not be applied until primers and/or sealers have been properly applied.
- H. Painting Contractor shall be responsible to see that all surface rust and mill scale is removed in accordance with the Steel Structures Painting Council. This process should be performed to a minimum of SSPC-SP-2, Hand Tool Cleaning or SSPC-SP-3, Power Tool Cleaning.
- I. Sand new wood and metal surfaces to roughen surfaces before the application of primer. Glossy and semi-glossy surfaces shall receive similar attention before application of finish coat when repainting.
- J. Concrete, masonry, stucco, EIFS, plaster and similar surfaces shall be permitted to cure properly for 28 days, minimum, before application, unless specifically stated on the product data sheet, no exceptions allowed. Surfaces shall be checked with an electronic moisture meter for maximum allowable moisture content before application.
- K. Concrete, masonry, stucco, EIFS, plaster and similar surfaces shall be pressure cleaned with minimum 2500 psi, 8"-wide pattern water stream before the application of elastomeric systems. Surface shall then be water-bead tested to assure that contaminants have been removed. Note: Surfaces should be allowed to dry a minimum of 48 hours before priming or painting.
- L. Shellac-based knot sealers shall be used over knots and resinous areas in wood before the application of primer.
- M. Apply elastomeric patching compound to cracked stucco and concrete surfaces before applying elastomeric coating. Application of sealants or exterior caulking to cracked stucco and concrete surfaces is unacceptable.

3.3 COMPATIBILITY

- A. Materials shall be applied as one unified system, i.e. surface preparation, primer, second coat and third coat, all compatible products, each dependent upon the other, and as recommended by the coating manufacturer for a particular finish on a particular surface. Likewise, coating materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; tools and equipment and the method of application shall be compatible with the coating to be applied.
- B. Thinners, if any, shall be only those recommended for that purpose by the manufacturer of the material to be thinned.
- C. Coating materials selected for systems for each type of surface shall be the product of a single

manufacturer.

D. Paint Color Selections:

1. Architect and Owner will select paint colors for exterior and interior, including accent trim colors.
 - a. Submit color samples from one of the acceptable manufacturers as herein indicated.
 - b. Submittal shall include written, detailed color designations for the entire Project where paint coatings are specified.

N. Environmental Conditions: Adhere to strict conformance of paint manufacturer's written instructions with regard to temperature, humidity and moisture content requirements.

O. Do not apply finishes over UL door and frame labels.

P. Ensure that exterior caulks and/or sealants have not been applied until primers and/or sealers have been properly applied.

Q. Concrete, cement plaster (stucco), EIFS and CMU shall be allowed to cure for a minimum of 28 days before the application of any primers, finishes or coatings (including elastomeric). Concrete includes cast-in-place, pre-cast, tilt-wall, composite insulating panels and the like. Ensure that inspections for "Wet Film Thickness" (WFT) and "Dry Film Thickness" (DFT) are completed and approved.

R. Topcoats shall not be applied over inadequately cured primers.

S. Apply each coat in the dry film thickness as recommended by the coating manufacturer. Coating thickness is based on the recommended WFT and DFT as listed on product data sheet. Ensure that inspections for pH are completed and approved on all masonry and concrete surfaces before application of any primers, sealers or painting coating.

3.2 PROPER SEQUENCE AND SCHEDULING

A. Slightly increase the tint color of succeeding coats.

B. Allow sufficient time between successive coats for proper drying, in accordance to the manufacturer's written instructions.

C. The number of coats and film thickness required are the same regardless of application method. Coatings shall be solid, continuous and producing pinhole-free surfaces.

D. Omit primer over metal surfaces that have been shop primed and touchup painted.

E. If undercoats, stains or other conditions show through final coat of paint, at no additional cost to Owner, apply additional coats until paint film is of uniform finish, color and appearance. Give special attention to ensure that edges, corners, crevices welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3.3 PROTECTION DURING CONSTRUCTION

- A. Protect work of other trades against damage from painting, whether being painted or not. Provide "Wet Paint" signs to protect newly painted finishes.

3.4 PAINT SCHEDULES

- A. The number of coats indicated are minimum. Apply additional coats as required to completely cover substrate and comply with quality specified at no additional cost to Owner.
- B. Apply each coat in the minimum dry film thickness specified, unless greater thickness is recommended by the manufacturer of the coating being applied.

3.5 INTERIOR PAINT SCHEDULE

A. Concrete Masonry Units:

- 1. Semi-Gloss Acrylic Enamel Finish: 2 Coats over filled surface with total dry film thickness not less than 2.5 mils, excluding filler coat.
 - a. Filler Coat: SW PrepRite Interior/Exterior Block Filler B25W25. Apply filler coat at a rate to ensure complete coverage with pores filled.
 - b. Second Coat: SW ProMar 200 Interior Latex Semi-Gloss Enamel B31W200.
 - c. Third Coat: SW ProMar 200 Interior Latex Semi-Gloss Enamel B31W200.
- 2. Epoxy Finish: Dry film thickness as recommended by the paint manufacturer.
 - a. Filler Coat: Heavy Duty SW Epo-Flex Epoxy Block Filler
 - b. Second Coat: SW Waterbase Epoxy B70 / B60V25.
 - c. Third Coat: SW Waterbase Epoxy B70 / B60V25.

B. Concrete, Cast-in-Place and Precast and Plaster:

- 1. Semi-Gloss Acrylic Enamel Finish: 3 Coats with total dry film thickness not less than 5.5 mils.
 - a. First Coat: SW PrepRite Masonry Primer B28W300.
 - b. Second Coat: SW ProMar 200 Interior Latex Semi-Gloss Enamel B31W200.
 - c. Third Coat: SW ProMar 200 Interior Latex Semi-Gloss Enamel B31W200.
- 2. Epoxy Finish: Dry film thickness as recommended by the paint manufacturer.
 - a. First Coat (primer): SW Waterbase Tile Clad Amine Epoxy Primer B73.
 - b. Second Coat: SW Waterbase Tile Clad Amine Epoxy Primer B73.

C. Gypsum Board:

- 1. Eggshell Finish: 3 Coats with total dry film thickness not less than 4.5 mils.
 - a. First Coat (primer): SW Prep Rite 200 Latex Primer B28W200.
 - b. Second Coat: Sw ProMar 200 Interior Latex Egg-Shell Enamel B20W200.
 - c. Third Coat: Sw ProMar 200 Interior Latex Egg-Shell Enamel B20W200.
- 2. Epoxy Finish: Dry film thickness as recommended by the paint manufacturer.
 - a. First Coat (primer): SW Prep-Rite Classic 200 Primer.
 - b. Second Coat: SW Waterbase Epoxy B70 / B60V25
 - c. Third Coat: SW Waterbase. Epoxy B70 / B60V25

D. Ferrous Metal:

- 1. Semi-Gloss Finish: 3 Coats with total dry film thickness not less than 5.5 mils.
 - a. First Coat (primer): SW Kem Kromik Universal Metal Primer B50.

- b. Second Coat: SW Pro Mar 200 Latex Semi-Gloss B31W200.
 - c. Third Coat: SW Pro Mar 200 Latex Semi-Gloss B31W200.
- E. Galvanized Metal:
- 1. Semi-Gloss Finish: Dry film thickness as recommended by the paint manufacturer.
 - a. First Coat: SW DTM Primer Finish B66W1.
 - b. Second Coat: Sw DTM Acrylic Semi-Gloss B66.
- F. Exposed Wood:
- 1. Transparent Finish: Dry film thickness as recommended by the paint manufacturer.
 - a. First Coat: SW Wood Classics Oil Stain.
 - b. Second Coat: SW Wood Classics Polyurethane (gloss as selected).
 - c. Third Coat: SW Wood Classics Polyurethane (gloss as selected).
- G. Open Ceilings / Exposed Structure: Provide the following finish system on exposed overhead surfaces and structural steel:
- 1. Surface Preparation and Primer Coat: As recommended by manufacturers of structural steel framing, joists, metal deck and other items, in compliance with specifications. Touch up with original primer.
 - 2. First and Second Finish Coats: SW Spraylastic B42T17.
- H. Plywood (Communications) Backboards:
- 1. First (Prime) Coat: Latex type primer applied at the spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 4 mils.
 - 2. Second and Third Coats: SW Flame Control #20-20 Flat, intumescent type, fire retardant latex paint, applied at the spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 4 mils for each coat (total 8 mils).
- I. Concrete Floor Stain:
- 1. The concrete floor must be etched, cleaned, vacuumed and prepared (i.e. stain, grease removal, etc..., per stain manufacturer's latest recommendations/requirements)
 - 2. First and Second Finish Coats, Water-Based Acrylic, solid/opaque color stain
SW "H&C Shield Plus Ultra Concrete Stain Solid Color.

3.6 EXTERIOR PAINT SCHEDULE

- A. Concrete Masonry Units: Dry film thickness as recommended by the paint manufacturer, but not less than 12.0 mils dft.
- 1. First Coat: SW Heavy Duty Block Filler B42W46. Apply filler coat at a rate to ensure complete coverage with pores filled.
 - 2. Second Coat: SW Duration K33 Ext Acrylic Latex Satin.
 - 3. Third Coat: .SW Duration K33 Ext Acrylic Latex Satin
- B. Concrete, Cast in Place and Pre-cast: Dry film thickness as recommended by the paint manufacturer, but not less than 5.0 mils dft.
- 1. First Coat: Loxon Conditioner A24W100.
 - 2. Second Coat: .SW Duration K33 Ext Acrylic Latex Satin
 - 3. Third Coat: SW Duration K33 Ext Acrylic Latex Satin.

- C. Stucco: Dry film thickness as recommended by the paint manufacturer, but not less than 13.5 mils dft.
 - 1. First Coat: SW Loxon Acrylic Primer A24W300.
 - 2. Second Coat: SW SherLastic Elastomeric A5.

- D. Ferrous and Galvanized Metal: Dry film thickness as recommended by the paint manufacturer, but not less than 7.5 mils dft.
 - 1. First Coat: Tnemic Series 90-97 Tneme-Zinc. 2.5 mils dft.
 - 2. Second Coat: Tnemic Series 1075 Endura Shield II. 3.0 mils dft.
 - 3. Third Coat: Tnemic Series 1076 Flouronar Clear. 2.0 mils dft.

- E. Aluminum: Dry film thickness as recommended by the paint manufacturer, but not less than 6.3 mils dft.
 - 1. First Coat: SW Pro-Industrial Pro-Cryl Universal Primer B66-310
 - 2. Second Coat: SW Pro-Industrial High-Performance Acrylic B66-650
 - 3. Third Coat: SW Pro-Industrial High-Performance Acrylic B66-650

- F. TRAFFIC MARKING PAINT (on asphalt)
 - 1. Setfast Acrylic Latex (Asphalt shall cure a minimum of 60 days before application of traffic marking paint. As a temporary measure only, a 1-mil layer of traffic marking paint may be applied.)
 - a. White TM2160.
 - b. Yellow TM2159.
 - c. Blue TM2133

END OF SECTION 09 91 00

SECTION 10 14 16 – PLAQUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 REFERENCES

- A. Florida Building Code, latest edition.

1.3 SUBMITTALS

- A. Manufacturer's Product Data sheets shall be required for each item specified.
- B. Shop Drawings: Contractor, before fabrication, shall submit and have received approval of the full size rubbing from Architect before casting. Manufacturer shall be responsible for text spacing on plaque compatible with font style and industry standard, subject to final approval by Architect.

1.4 QUALITY ASSURANCE

- A. Contractor Qualifications: Employ only experienced Contractors (Installers) skilled in the successful installation of the specified materials and assemblies. Installers shall be state-certified or licensed Contractors.
- B. Manufacturer Qualifications: Employ only manufacturers with at least five (5) years experience making the specified materials as a current catalog and regular production item.
- C. Preparation/Field Verification: Verify that full size Shop Drawings have been successfully submitted, reviewed and returned with approval before fabrication of the plaque is begun.

1.5 WARRANTY

- A. Manufacturer's Warranty: The manufacturer shall warranty the plaque for 10 years.
- B. Installer's Warranty: The installer shall warranty his installation of the plaque to remain positively attached to the structure for a period not less than five (5) years.
- C. Warranties shall begin on the date of Substantial Completion.

1.6 PROJECT CLOSEOUT

- A. Cleanup: After installation and before dedication, the plaque shall be cleaned using a product recommended by the manufacturer.

PART 2 - PRODUCT SYSTEM

2.1 ACCEPTABLE MANUFACTURERS

- A. The following manufactures are approved:
1. Architectural Bronze & Aluminum Corporation
 2. Bronze Plaques
 3. Innovative Signs, Inc
 4. The Bronze Plaque
 5. The Southwell Co

2.2 COMPONENT PERFORMANCE CHARACTERISTICS:

- A. Bronze Alloy: 85-5-5 U.S. Standard, as tested in ASTM B584 Standard Specification for Copper Alloy Sand Castings for General Applications. UNS No. C83600 (No.1 manganese bronze).

2.3 FABRICATION

- A. Castings shall free from pits, scale, sand holes and any other defects.
- B. The size of the plaque is 18" wide by 24" high. The mounting height shall be 60" above finish floor (AFF) to the bottom of the plaque, unless noted otherwise
- C. Provide a plaque for each building.
- D. Exact plaques deigns and locations shall be as determined by the Owner.

2.4 CAST PLAQUE

- A. Tablet: Cast of virgin ingots as explained in Part 2, Par. 2.2.A.
- B. Border: Narrow raised band with satin finish.
- C. Letters: Raised with satin finish. The style of lettering and the height of the letters are specified in the drawings.
- D. Mechanical Fasteners: Match pebble finish of cast plaque background.
- E. Background: Oxidized with pebble finish.
- F. Cleaning: Plaque shall be chemically cleaned and sprayed with 2 coats of clear lacquer.

PART 3 - QUALITY ASSURANCE DURING EXECUTION

3.1 INSTALLATION ENVIRONMENTAL CONDITIONS

- A. Specified item shall not be delivered or installed until the building is near substantial completion, the exterior canopies are installed and the interior and exterior wall finish has been completed.

- B. No installation shall begin until all product submittals and approvals been made and the plaque location verified by the Owner and the Architect.

3.2 INSTALLATION PROCEDURES/ADJUSTMENT PROCEDURES

- A. Provide all items and accessories as required for a total and complete installation in every respect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of any items indicates all conditions are satisfactory and acceptance of previous Work by other Contractors
- C. Plaque is a surface mount installation.
- D. Install plaque level, plumb and at the heights indicated or as directed by the Owner.
- E. Install plaque using manufacturer's standard mechanical fasteners, matching finish of plaque. A minimum of four fasteners is required.
- F. Mechanical fasteners shall be placed through predrilled holes in the plaque and into the structure. The head of the mechanical fastener shall match the background of the plaque.
- G. "Project Name"
- H. "Council Members Names"
- I. "Public Works Director Name"
- J. "Architect's Name"
- K. "Contractor Name"
- L. "Completed 202x"
- M. Border – 5/16" wide
- N. Provide Arial/Bold, Upper / Lower Case Letters, triple space between the Project Name and Council Members. Single space between Council Members. Provide double space between Council Member and Public Works Director and Architect and Contractor. Triple space between Contractor and Completion Date.

END OF SECTION 10 14 16

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PPPSECTION 10 14 20 – SIGNAGE

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

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials, and equipment necessary for the complete installation of identifying devices as indicated on the Drawings and specified herein.
 - 1. Interior and exterior signage.
 - 2. Exterior building letters.
 - 3. Interior signage includes, but may not be limited to, the following:
 - a. Capacity signs
 - b. Toilet room handicapped signs
 - c. Interior room name and number signs
 - d. Access signage
 - e. Evacuation signage
 - f. Roof access signage
 - g. Fire riser inside signage
 - h. Interior and exterior building letters
 - i. Exterior Monument signs
 - j. Exterior Ground signs

1.3 SUBMITTALS

- A. Product data sheets and samples for each item specified.
 - a. Manufacturer's color charts consisting of actual units or sections of units showing full range of colors available each product.
- B. Furnish shop drawings and other submittals as required for Architect's selection in accordance with Division 01 requirements.
 - 1. Indicate the proposed evacuation routes.
 - 2. Include the following for exterior signage:
 - a. Fabrication and installation details.
 - b. Indicate locations and type of electrical service connections.
 - c. Include detail of permanent copy showing both size and color.
 - d. Structural Engineering for permitting by sign contractor's engineer.

C. Samples

1. Interior room number and name signs.
2. Interior and exterior building letters.
3. Dedication plaque rubbing.
4. Evacuation signage.

D. Provide a comprehensive list of all room names and numbers for each building space as well as quantities and locations for all other signs specified.

1. Provide message list for each sign, including exact room name, room number, graphic symbol (if any) and Braille location.

E. Pre-Erection Conference Meeting Notes for interior and exterior signage

F. Submittal Requirements:

1. Shop Drawings and installation templates.
2. Warranty Requirements: Two-year warranty

1.4 QUALITY ASSURANCE

A. Reference Codes and Specifications: Florida Building Code, current edition.

B. Each door to each occupied space shall have a room sign installed including all restrooms, mechanical, electrical, janitor's closets and other rooms.

C. Contractor Qualifications: Employ only experienced Contractors skilled in the successful manufacture and installation of the signage on similar projects for a minimum of five years. Contractors shall be state-certified or licensed

D. Manufacturer Qualifications: Employ only manufacturers with at least five years' experience making the specified materials as a current catalog and regular production item.

E. Pre-Erection Conference: Before erection, meet on site with designated Owner's representative and verify exact placement of signage.

F. Source Limitations: Unless specifically noted otherwise, provide products of the same manufacturer for each type of unit.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Interior identifying devices, and exterior building letters shall be as manufactured by one of the following to match existing signage:

1. Basis of Design: APCO Graphics, Inc.
2. ASI - Modulex,
3. Environnemental Graphics, Inc., Odessa, FL
4. Multi-Graphics, Inc., Pelham, GA
5. Vital Signs of Orlando, Inc
6. Don Bell Signs, Inc.

2.2 INTERIOR SIGNAGE

- A. Capacity signs for all rooms with a capacity of 49 persons or more. (Sign Type 8)
1. Provide capacity signs 8 1/2 inches by 4 inches with all edges eased, reading "MAXIMUM CAPACITY. ###"
 2. Material: 1/8-inch thick clear matted acrylic plastic with all edges eased.
 3. Graphic Process: Raised letters and Braille, formed as an integral part of the sign face.
 4. Letters: Letters and numbers shall have width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Letters and numbers shall be raised 1/32-inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8-inch high minimum and 2 inches high maximum.
 5. Characters and backgrounds must be eggshell, matte, or other non-glaze surface.
 6. Provide one sign per room.
 7. This sign shall include the "MAXIMUM CAPACITY ###" to include the rooms maximum capacity number.
- B. Toilet Room Handicapped Signs:
1. Provide one sign depicting International Men/Women Symbol at each toilet room, equipped with facilities for handicapped. Size shall be 8 inches by 8 inches with 3/8-inch radius corners.
 2. Material: 1/8-inch thick matte acrylic plastic with all edges eased.
 3. Graphic Process: Raised letters and Braille, formed as an integral part of the sign face.
 4. Colors: Letters and background colors as selected by Architect from manufacturer's standard colors.
 5. Letters: Letters and numbers shall have width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Letters and numbers shall be raised 1/32-inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8-inch high minimum and 2 inches high maximum. Refer to Drawings for sizes indicated. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram.
 6. Characters and backgrounds must be eggshell, matte, or other nonglazed surface.
- C. Interior Room Name and Number Signs
1. Provide sign size per sign types below with 3/8-inch radius corners.
 2. Layout of room names and numbers shall be as directed by the Architect. Contractor to provide list of room names and numbers in "generic" form, i.e., Office, etc.
 3. Material: 1/8-inch thick matte acrylic plastic with all edges eased.
 4. Graphic Process: Raised letters and Braille, formed as an integral part of the sign face.
 5. Colors: Letters and background colors as selected by Architect from manufacturer's standard colors.
 6. Letters: Letters and number shall have width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Letters and numbers shall be raised 1/32-inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8-inch high minimum and 2 inches high maximum.
 7. Characters and backgrounds must be eggshell, matte or other non-glaze surface.
- D. Evacuation Signage

1. Provide evacuation signs 8 ½ inches by 11 inches with all edges eased on 3/8-inch radius corners, indicating a graphic diagram of primary and secondary evacuation routes posted inside, adjacent to the primary exit door. Provide at all rooms with occupancy of 6 or greater.
2. Material: 1/8-inch thick clear matted acrylic plastic with all edges eased.
3. Colors: Black building plan on white background with evacuation route in red.
4. Signage manufacturer shall be responsible for suggested evacuation routes and indicate on signage.

E. Fire Riser Inside Signage

1. Provide Fire Riser Inside signage to read: "FIRE RISER INSIDE". Locate as directed by the Architect.

F. Egress Signage

1. Signs for means of egress shall comply with Florida Accessibility Code, latest edition.
2. Doors at exit passageways, exit discharge, and exit stairways shall be identified by tactile signs complying with Section 703 of the Accessibility Code.
Provide signage adjacent to elevator for egress in case of fire.

2.3 INTERIOR BUILDING SIGNS / LETTERS

- A. Size and location shall be as indicated on the drawings, pin mounted with ¾ inch standoff on gypsum board wall. Baked enamel finish with style and color to be selected by Architect. Provide list of fonts that will be selected by Architect.

2.4 EXTERIOR BUILDING SIGNS / LETTERS

- A. Size, style and location as indicated on drawings. baked enamel finish. Color and location to be selected by Owner/Architect.
- B. Material: Cast aluminum.
- C. Installation Method: Pin mounted, ¾ inch from wall.
Tamper-proof, non-rusting, non-corroding, non-staining pin mounted, ¾ inch from the wall as recommended by manufacturer; aluminum letters shall be protected from galvanic action with a coat of asphalt varnish or a zinc-molybdate primer.
- D. Provide a clear back on building letters.
- E. Verify actual copy & layout with Owner & Architect before fabrication

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

- B. Mount interior signage with concealed mechanical fasteners recommended by manufacturer.
- C. Provide mounting and installation kits for mounting building letters.
- D. Mount exterior and interior building letters in conformance with manufacturer's instructions.
- E. Install interior signage in accordance with approved shop drawings, Accessibility Requirements Manual from the Florida Department of Community Affairs, and at locations indicated on the Contract Documents.
- F. Inspect materials or equipment immediately upon delivery and again before installation. Reject damaged and defective items.
- G. Provide attachment and connection devices necessary for securing Work. Secure Work true to line and level. Allow for building expansion.
- H. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- I. Recheck measurements and dimensions, before starting each installation.
- J. Isolate incompatible material as necessary to prevent deterioration.
- K. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.
 - 1. Comply with State and Local ADA Codes.

End of Section

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SECTION 10 26 00 – WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Work of this Section includes:
 - 1. Surface-mounted corner guards to protect outside corners of gypsum board walls and column wraps.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's standard, technical data and detailed specifications for each system component to show compliance with requirements.
 - 1. Include data for all required installation accessory units and complete installation instructions for each type of substrate as shown and/or indicated.
- B. Samples: Submit a 6 inch long full size sample.
- C. Submittal Requirements:
 - 1. Local / Regional Materials – Manufacturer's statement indicating the locations where the base materials of each product were extracted, mined, quarried, harvested, etc. Low-Emitting Materials:
 - a. Sealants, Adhesives and/or Primers: Provide manufacturer's product data for sealants, adhesives, and/or primers. Include printed statement of volatile organic compound (VOC).

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide wall protection systems and components with a UL label indicating they are identical to those tested in accordance with ASTM E84 for Class I characteristics as follows:
 - 1. Flame spread 25 or less, smoke developed 450 or less.
- B. Wall and door protection materials shall comply with applicable requirements of the following standards:
 - 1. ASTM D256, "Standard Test Method for Determining the Izod Pendulum Impact Resistance of Plastics."
 - 2. ASTM D1784, Class I, "Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds."
 - 3. ASTM E84, "Standard Test Method for Surface Burning Characteristics of Building Materials."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
1. Basis of Design_INPRO, 160BN
 2. Approved Equivalent Product Manufacturers are listed below subject to approval in compliance with Division 01, Section -Product Requirements
 3. Construction Specialties, Inc.,
 4. Korogard Wall Protection Systems, Div. of RJF International Corporation,
 5. Pawling Corporation,

2.2 MATERIALS (See Room Finish Schedule)

- A. Flush stainless steel, for 90-degree corners, 1 1/2 inch legs. 8 feet high. Installed on all exterior corners throughout to protect gypsum board walls from abuse. Fabricate from 0,0625 inch thick material conforming to ASTM A 167, Type 302 or 304. Fasteners shall be stainless steel.
- B. Surface-mounted, resilient, rigid vinyl corner guard; assembly consisting of snap-on plastic cover installed over continuous retainer, including hardware. Cover – extruded rigid plastic, 2” legs, 90° corners, 8 feet high AFF, color and texture selected from manufacturer’s full range, retainer full height of cover with prefabricated top and bottom caps.

2.3 FABRICATION

- A. Fabricate wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Walls shall be in proper condition to receive corner guards so that units will be installed plumb and shall be rigidly connected and properly secured to substrates as shown and/or indicated.
- B. Installation of corner guards shall not begin until wall finishes are complete, including painting.
- C. Surface Preparation: Prior to installation clean substrates to remove dirt, debris, and loose particles. Perform additional preparation procedures as required by the manufacturer.
- D. Protect material from damage during storage and installation.

3.2 INSTALLATION

- A. Install in accordance with the manufacturer's written instructions and reviewed shop drawings.

- B. Use only approved mounting methods as recommended by the manufacturer and locate all components firmly into position, level, and plumb.
- C. Corner guards shall be installed from top of base to 8'-0" A.F.F, unless indicated otherwise on the Drawings and details.

3.3 CLEANING AND PROTECTION

- A. Immediately upon completion of installation, clean covers in accordance with the manufacturer's written instructions.
- B. Remove debris from the Project site.
- C. Protect installed components and materials to prevent damage by other trades.

END OF SECTION 10 26 00

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SECTION 10 28 00 – TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes toilet accessory items as scheduled and specified. Refer to the Toilet Accessory Schedule on Drawing Sheet A601 for product numbers.

1.3 SUBMITTALS

- A. Product Data: For each toilet accessory item specified, including construction details relative to materials, dimensions, gauges, profiles, mounting method, specified options, and finishes.
 - 1. Include maintenance instructions and manufacturer's list of replaceable parts and service recommendations.
- B. Schedule indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project.
- C. Shop and Setting Drawings: Provide manufacturer's complete set of shop drawings indicating units, adjacent and substrate materials, and anchoring proposed for each condition in work.
 - 1. Include setting drawings where cutouts are required in other Work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.
- D. Samples: Submit full-size samples for each substitute product proposed for use in work that is not specified in Contract Documents.
- E. Submit warranty and accessory keys as specified herein.
- F. Submittal Requirements:
 - 1. Materials and Resources – Local/Regional Materials: goal is to obtain materials and products from within a regional radius of 500 miles of the Project site.

1.4 QUALITY ASSURANCE

- A. Contractor's Qualifications: Work shall be performed by firm that is skilled in the successful installation of specified materials and assemblies with not less than 5 years experience.
 - 1. Firm shall be a state certified or licensed subcontractor.
 - 2. Only authorized factory installer shall be used.
- B. Manufacturer's Qualifications: Provide products from a firm that makes the indicated products as a regular production item and has the capability of providing quantity of units so as not to delay

the progress of work at Project site.

- C. Inserts and Anchorages: Provide accessory Manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other Work to avoid delay.
- D. Single-Source Responsibility: Provide products of same Manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.
- E. Preparation and Field Verification:
 - 1. Before start of installation of wall finishes, installer shall verify that required blocking has been installed in proper locations.
 - 2. Verify that installation of finishes and required anchoring devices are complete.
 - 3. Include field dimensions on shop drawings.
- F. Industry Standards: Work shall comply with applicable provisions of the following:
 - 1. ANSI A117.1, "Accessible and Usable Buildings and Facilities."
 - 2. OSHA Department of Labor CFR 29, section 1910.141: Sanitation.

1.5 PROJECT CONDITIONS

- A. Coordinate accessory locations, installation, and sequencing with other Work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

1.6 WARRANTY

- A. Toilet Accessory Warranty: Provide manufacturer's one (5) year warranty from the Date of Substantial Completion, against defects in material and workmanship, unless otherwise indicated.
- B. Mirror Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within 15 years from the Date of Substantial Completion.

1.7 PROJECT CLOSEOUT

- A. Closeout Submittals: Provide in accordance with Division 01 Sections as work of Project closeout documents including, but not necessarily limited to, operating and maintenance manuals, replacement parts list, and recommended maintenance and service schedules and contact information for authorized service centers.
- B. Keys: Provide six (6) universal keys for interior access to toilet accessories for servicing and refilling units.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORY MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:
1. Basis of Design: Bobrick Washroom Equipment, Inc
 2. Approved Equivalent Product Manufacturers are listed below subject to approval in compliance with Division 01, Section -Product Requirements
 3. A & J Washroom Accessories, Inc
 4. American Specialties, Inc.
 5. Bradley Corporation
 6. Koala Kare Products, Div. of Bobrick,

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gage) minimum thickness.
- B. Brass: Leaded and unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16; Castings, ASTM B30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A1008, 0.04-inch (20-gage) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A653, G-60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.
- F. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.
- G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.3 FABRICATION

- A. No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating Manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.
- E. Product Description
1. Grab Bars: 18-gauge, 1 ¼" OD satin-finish, type 304 stainless steel straight bars with peened nonslip gripping surface; 3-inch diameter mounting flange for exposed mounting; flange heliarc welded to bar to form structural unit. Grab bar shall comply

- with ADAAG.
2. Paper Towel Dispenser/Waste Receptacle: Recessed unit fabricated from Type 304 satin-finish stainless steel with all-welded construction and seamless beveled flange. Door shall be secured to cabinet with full-length stainless steel piano hinge. Holds 800 multifold towels with 12 gal removable waste liner. Requires 4" min depth recess.
 3. Waste Receptacle: Recessed unit fabricated from Type 304 satin-finish stainless steel with all-welded construction and seamless beveled flange. Removable 12-gal receptacle locks into cabinet. Requires 4" min depth recess.
 4. Wall Mirror: Safety glass mirror with one-piece 3/4 by 3/4-inch satin-finish stainless steel, angle frame, complete with concealed 20-gauge wall hanger for theft resistant mounting. Glass edges shall be protected by plastic filler strips and backs shall be protected by shock-absorbing, water-resistant polyethylene padding.
 5. Soap Dispenser: Surface mounted, horizontal tank, satin-finish type 304 stainless steel with concealed wall fastening and 40 fl. oz. capacity. Container: unbreakable, clear acrylic refill indicator window, locked and hinged stainless steel lid.
 6. Toilet Tissue Holder: Surface mounted, heavy-duty, satin finish cast aluminum with high impact plastic spindles and concealed locking device; theft resistant spindles without controlled delivery. Holds two rolls up to 6" diameter.
 7. Sanitary Napkin Disposal: Surface-mounted, satin-finish type 304 stainless steel all-welded construction with self-closing panels; Door shall be secured to cabinet with spring-loaded, full-length stainless steel piano hinge equipped with tumbler lock. 1.2 gal (min) plastic, removable receptacle and tumbler lock.
 8. Robe Hook: Satin-finish type 304 stainless steel with concealed mounting bracket.
 9. Mop Holder: 36-inch long, satin-finish type 304 stainless steel with 4 spring-loaded rubber cam anti-slip mop holders.
 10. Book Shelf: 6"W x 30"L 18-8 type 304 satin-finish stainless steel shelf with all hemmed edges and 2 angled support brackets.
 11. Surface mounted folding shower seat: Foam padded, white vinyl seat with stainless steel frame and wall mounting.
 12. Changing Stations: Wall/Surface mount, horizontal, stainless steel, steel-on-steel hinge, concave interior surface, child safety straps, easy opening-closing mechanism and safety stop system, convenient bag hook on both sides, built-in dispensers, multi-language instructions.
 13. Surface mounted paper towel dispenser. satin-finish type 304 stainless steel all-welded construction.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

- D. Provide attachment and connection devices and methods necessary for securing accessories.

3.2 INSTALLATION

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to Manufacturer's instructions for type of substrate involved. Provide sealant and backer rod as required to infill gaps between the mirror and wall.
- C. Install grab bars to withstand a downward load of at least 250 lbf, complying with ASTM F446.
- D. Provide all items and accessories as required for a complete and total installation in every respect, whether or not specified or indicated on the Drawings.

3.3 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10 28 13

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SECTION 10 44 15 – FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes:

- 1. Fire extinguishers
- 2. Fire extinguisher cabinets
- 3. Fire extinguisher mounting brackets

1.3 SUBMITTALS

- A. Product data for cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.
- B. Manufacturer's color charts consisting of actual units or sections of units showing full range of colors available for each type of cabinet finish indicated or exposed to view.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single Manufacturer.
- B. Coordination: Verify that cabinets are sized to accommodate type and capacity of extinguishers indicated and provided by Owner under separate Contract.
- C. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- D. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. J.L. Industries
 - 2. Larsen's Manufacturing Co.
 - 3. Potter-Roemer, Inc.

2.2 FIRE EXTINGUISHERS

- A. Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard that comply with authorities having jurisdiction.
 - 1. Multipurpose Dry Chemical Type: UL-rated 4-A:60-B:C, 10-lb nominal capacity, in enameled steel container.
 - 2. Wet Chemical Type: UL-rated 2A:1B:C:K, 6-liter capacity in a steel container for kitchen locations.
- B. All fire extinguishers shall have a current inspection tag and an expiration date of at least eleven months after the Date of Substantial Completion.

2.3 MOUNTING BRACKETS

- A. Brackets: Designed to prevent accidentally dislodging extinguisher, of sizes required for type and capacity of extinguisher indicated, in plated finish.
 - 1. Provide brackets for extinguishers not located in cabinets.
- B. Wall Bracket anchors to each have a pull strength of 150 pounds.

2.4 CABINETS

- A. Construction: Manufacturer's standard box, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
- B. Fire-Rated Cabinets: UL listed with UL listing mark with fire-resistance rating of wall where it is installed.
- C. Cabinet Mounting for framed Gypsum board wall:
 - 1. Fully-Recessed: Cabinet box (tub) recessed in stud walls with sufficient depth.
 - 2. Semi-Recessed: Cabinet box (tub) partially recessed in walls of shallow depth.
 - 3. Stainless Steel Trim Style: Fabricate trim in one piece with corners mitered, welded, and ground smooth.
 - 4. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - 5. Semi-Recessed: Rolled-edge trim with 3-inch backbend depth.
- D. Cabinet Mounting for Concrete / Masonry Wall:
 - 1. Cabinet box fully exposed and surface mounted directly to wall with no trim.
 - 2. Cabinet Material Stainless Steel.
- E. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
 - 1. Brushed stainless steel, #4 finish, flush, solid, with vertical die-cut red lettering.

2. Door Full Glazing: Clear tempered Float Glass

- F. Door Hardware: Manufacturer's standard door-operating hardware for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch and concealed or continuous-type hinge permitting door to open 180deg.
- G. Identify bracket-mounted extinguishers with FIRE EXTINGUISHER in red letter decals applied to wall surface. Use letter size, style, and location as selected by Architect.

2.5 CABINET FINISHES

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.
- C. Interior: White enamel.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Follow manufacturer's printed instructions for installation.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
 - 1. Prepare recesses in walls for cabinets as required by type and size of cabinet and style of trim and to comply with Manufacturer's instructions.
 - 2. Fasten mounting brackets and cabinets to structure, square and plumb.
 - 3. Mounting Height: 54 inches maximum above finished floor to the top of box, making top of bottle at 48 inches AFF.

END OF SECTION 10 44 15

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SECTION 12 32 16 – PLASTIC LAMINATE FACED CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-faced wood cabinets of stock design.
 - 2. Plastic-laminate countertops.
 - 3. Wall shelving.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.
- C. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with "Custom Grade" requirements for modular cabinets in conformance with AWI's "Architectural Woodwork Quality Standards."
 - 1. Provide AWI Quality Certification Program certificate indicating that manufactured wood casework complies with requirements.
- B. Product Designations: Drawings indicate sizes, configurations, and finish material of casework. Manufacturers' casework of similar sizes and door and drawer configurations, of same finish material, and complying with the Specifications may be considered. Refer to Division 01 Section "Product Requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install manufactured wood casework until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with manufactured wood casework by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of manufactured wood casework.

1.8 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of manufactured wood casework that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of components or other failures of glue bond.
 - b. Warping of components.
 - c. Failure of operating hardware.
 - d. Deterioration of finishes.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Plastic-Laminate-Clad Manufactured Casework:
 - a. Case Systems Inc.
 - b. Commercial Casework
 - c. LSI Corporation.
 - d. Stevens Industries, Inc.
 - e. TMI Systems Design Corporation.

2.2 MATERIALS, GENERAL

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, either veneer core or particleboard core unless otherwise indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: One of the following:
 - 1. ANSI A208.1, Grade M-2.
 - 2. Straw-based particleboard complying with ANSI A208.1, Grade M-2, except for density.

- E. MDF: ANSI A208.2, Grade 130.
- F. Hardboard: AHA A135.4, Class 1 Tempered.
- G. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
- H. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine- impregnated decorative paper complying with LMA SAT-1.
- I. Edgebanding for Plastic Laminate: Plastic laminate matching adjacent surfaces, or rigid PVC extrusions, through color, satin finish, 3 mm thick at doors/drawer fronts, 1 mm thick elsewhere.
- J. Edgebanding for Thermoset Decorative Panels: PVC or polyester edge banding complying with LMA EDG-1 and matching thermoset decorative panels.

2.3 CABINET MATERIALS

- A. Exposed Cabinet Materials:
 - 1. Plastic Laminate: Grade HGS and VGS, as required by woodwork quality standard.
 - 2. Unless otherwise indicated, provide specified edgebanding on all exposed edges.
- B. Semiexposed Cabinet Materials:
 - 1. Plastic Laminate: Grade VGS and CLS, as required by woodwork quality standard.
 - a. Provide plastic laminate for interior faces of doors and drawer fronts and where indicated.
 - 2. Thermoset Decorative Panels: Provide thermoset decorative panels for semiexposed surfaces unless otherwise indicated.
 - 3. Metal for Steel Drawer Sides: Cold-rolled, steel sheet.
 - 4. Unless otherwise indicated, provide specified edgebanding on all semiexposed edges.
- C. Concealed Cabinet Materials:
 - 1. Plastic Laminate: Grade BKL.

2.4 DESIGN, COLOR, AND FINISH

- A. Design: Provide manufactured wood casework of the following design:
 - 1. Flush overlay with wire pulls.
- B. Thermoset Decorative Panel Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.
- C. Plastic-Laminate Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.
- D. PVC Edgebanding Color: As selected from casework manufacturer's full range.

2.5 CABINET FABRICATION

- A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
 - 1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch

- particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces.
2. Shelves: 3/4-inch thermoset decorative panels.
 3. Backs of Cabinets: 1/2-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces.
 4. Drawer Fronts: 3/4-inch particleboard, plastic-laminate faced.
 5. Drawer Bodies: One of the following:
 - a. Wood or Wood Products:
 - 1) Drawer Sides and Backs: 1/2-inch solid-wood, veneer-core hardwood plywood or thermoset decorative panels, with glued dovetail or multiple-dowel joints.
 - 2) Drawer Bottoms: 1/4-inch hardwood plywood or thermoset decorative panels glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
 - b. Steel Drawer System:
 - 1) Drawer Sides: Steel drawer sides designed as part of an integral slide system of not less than 100 lb capacity, metallic phosphate treated, and finished with manufacturer's standard baked-enamel finish.
 - 2) Drawer Backs and Bottoms: 1/2-inch solid-wood, veneer-core hardwood plywood or thermoset decorative panels.
 6. Doors: 3/4-inch particleboard or MDF, plastic-laminate faced.
- B. Leg Shoes: Vinyl or rubber, black, open-bottom type.
- C. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
- D. Concealed Cabinet Surfaces: Finish surfaces not covered with thermally fused melamine-impregnated decorative paper or plastic laminate (HGS, VGS, CLS, or BKL) with Conversion varnish, Catalyzed vinyl, or Catalyzed polyurethane.

2.6 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard powder-coated, commercial-quality, heavy-duty hardware.
1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Butt Hinges: Powder-coated, semiconcealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 hinges for doors less than 48 inches high and 3 hinges for doors more than 48 inches high.
- C. Pulls: Solid nylon, aluminum, stainless-steel, or chrome-plated brass wire pulls, fastened from back with two screws. For sliding doors, provide recessed stainless-steel or chrome-plated flush pulls. Provide 2 pulls for drawers more than 24 inches wide.
- D. Drawer Slides: BHMA A156.9, Type B05091.
1. Standard Duty (Grades 1 and 2): Side mounted and extending under bottom edge of drawer; partial-extension type; epoxy-coated steel with polymer rollers.
 2. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.
 3. Pencil Drawer Slides: Grade 2, drawers not more than 3 inches high & 24 inches wide.

4. Keyboard Slides: Grade 1, for computer keyboard shelves.
 5. Box Drawer Slides: Grade 1, for drawers not more than 6 inches high and 24 inches wide.
 6. File Drawer Slides: Grade 1HD-100, for drawers not more than 12 inches high and 24 inches wide.
 7. Trash Bin Slides: Grade 1HD-200, for trash bins not more than 20 inches high and 16 inches wide.
- E. Label Holders: Stainless steel or chrome plated, sized to receive standard label cards approximately 1 by 2 inches , attached with screws or brads.
1. Provide label holders where indicated.
- F. Drawer and Hinged Door Locks: Cylindrical (cam) type, 5-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
1. Provide a minimum of two keys per lock and six master keys.
 2. Provide locks where indicated.
- G. Sliding-Door Hardware Sets: Manufacturer's standard, suit type and size of sliding-door units.
- H. Adjustable Shelf Supports: Mortise-type, zinc-plated steel standards and shelf rests complying with BHMA A156.9, Types B04071 and B04091.
- I. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
- J. Paper Slots: 1-3/4 inches wide by 1 inch deep by length required; molded- plastic, paper-slot liner with 1/4-inch lip.

2.7 COUNTERTOPS

- A. Countertops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Provide front and end overhang of 1 inch over base cabinets.
- B. Plastic-Laminate Tops: Plastic-laminate sheet, shop bonded to both sides of 3/4-inch plywood or particleboard. Sand surfaces to which plastic laminate is to be bonded.
1. Plastic Laminate for Flat Tops: Grade HGS.
 2. Plastic Laminate for Backing: Grade BKL.
 3. Provide plastic-laminate edgings of the same material as top or 3-mm PVC edging unless specifically noted, on front edge of top, on top edges of backsplashes and end splashes, and on ends of tops and splashes.
 4. Use marine plywood for countertops containing sinks.

2.8 WALL SHELVING (Shall support 200 lb load minimum)

- A. Plastic-Laminate Shelving: Plastic-laminate sheet, Grade HGL or HGP, shop bonded to both sides of plywood. Sand surfaces to which plastic laminate is to be bonded.
1. Shelf Thickness: 3/4 inch .
 2. Edge Treatment: Finish both edges with plastic laminate that matches faces, rigid PVC extrusion, through color with satin finish, 3 mm thick, or minimum 1/8-inch- thick, solid-wood edging applied before plastic laminate.
- B. Adjustable Shelf Supports: (Unless noted otherwise) Subject to compliance with requirements,

provide 82/182 decorative, heavy-duty, double-track standards and brackets, by Knap & Vogt Manufacturing Company, or comparable product by another manufacturer.

1. Adjustable Shelf Standards: BHMA A156.9, B04102; standards shall have two slots running parallel for each shelf support.
2. Shelf Supports: BHMA A156.9, B04112; supports shall have two clips to fit within the standard.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of manufactured wood casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION

- A. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 16 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- C. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
 1. Fasten through back, near top and bottom, at ends, and not more than 16 inches o.c.
 2. Use toggle bolts at hollow masonry.
 3. Use expansion anchors at solid masonry.
 4. Use No. 10 wafer-head screws sized for 1-inch penetration at wood hanging strips.
 5. Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish at metal-framed partitions.
 6. Use toggle bolts at plaster on metal lath.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- E. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF TOPS

- A. Field Jointing: Where possible make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- B. Secure tops to cabinets with Z- or L-type fasteners or equivalent, using two or more fasteners at each front, end, and back.
- C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
- D. Secure backsplashes and end splashes to walls with adhesive.
- E. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 INSTALLATION OF SHELVING

- A. Securely fasten shelf standards to masonry, partition framing, wood blocking, or reinforcements in partitions.
 - 1. Fasten shelf standards at ends and not more than 12 inches o.c.
 - 2. Use toggle bolts at hollow masonry.
 - 3. Use expansion anchors at solid masonry.
 - 4. Use self-tapping sheet metal screws in metal framing or metal backing at metal-framed partitions. Do not use wall anchors in gypsum board.
 - 5. Use toggle bolts at plaster on metal lath.
- B. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Space standards not more than 30 inches o.c.
- C. Install shelving level and straight, closely fitted to other work where indicated.

3.5 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 12 32 16

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