

Seaside Rehabilitation and Health Care Center  
Phase II Lobby / Rehab Renovation  
Portland, Maine  
Issued for Construction  
July 18, 2014

SECTION 011000 - 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 under other contracts.
  - 2. Owner-furnished products.
  - 3. Use of premises.
  - 4. Owner's occupancy requirements.
  - 5. Specification formats and conventions.
- B. Related Sections include the following:
  - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Architect Identification: The Contract Documents were prepared for Project by Foreside Architects, 5 Fundy Road, Falmouth, Maine 04105. Telephone 207-781-3344.
- B. Construction Manager: Ledgewood Construction, 27 Main St., South Portland, ME. 207-767-1866.
  - 1. Construction Manager for this Project is Project's Constructor. In Divisions 01 through 49 Sections, the terms "Construction Manager" and "Contractor" are synonymous.

1.4 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated and /or as specified. The Work includes providing support systems to receive Owner's equipment.
  - 1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
  - 2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule, as agreed to by the Owner.

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3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them at no additional cost to the Owner.
11. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

1.6 USE OF PREMISES

- A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
- B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
  2. Driveways and Entrances: Keep adjacent roadways, driveways, parking, and entrances serving premises clear and available to Owner, Owner's employees, traffic, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
  3. Parking: Parking will be limited to immediate construction or delivery vehicles only. All workmen and personal parking shall be off-site parking. Each subcontractor will be responsible to coordinate transportation of subcontractor personnel from off-site parking to construction site. No on-site parking for personnel will be available.
- C. The Contractor shall supervise the actions of employees and subcontractors with regard to inappropriate activity at the site. Comply with the following requirements:
  1. Sexual harassment of any nature will not be tolerated.
  2. No pornography on property.
  3. No drugs on property.
  4. No guns or weapons on property.
  5. Failure to comply with the requirements outlined above will result in immediate action as directed by the Owner.
    - a. First Offense: The individual removed permanently from premises.

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- b. Second Offense: The responsible subcontractor removed permanently from premises.

1.7 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 building, before Substantial Completion, 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. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
  - 2. Contractor shall obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
  - 3. Before partial Owner occupancy, mechanical and electrical systems shall be operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
  - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 33-division format and CSI's "2004 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.
  - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- 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 shall be 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 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 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.

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1.9 MISCELLANEOUS PROVISIONS

- A. Material safety data sheets shall be made available in accordance with OSHA requirements.
- B. No asbestos containing materials shall be used in the work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012300 - ALTERNATES

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 alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

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- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Perimeter Up-Lights in Great Room.
1. Base Bid: Provide florescent perimeter lights in Great Room.
  2. Alternate: Provide LED lights in lieu of florescent perimeter lights in Great Room.

END OF SECTION 012300

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SECTION 012600 - 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 the following:
  - 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 or Owner 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." or format as approved by the Owner.

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 20 days after receipt of Proposal Request or earlier as specified in Proposal Request issued, submit a quotation estimating cost 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. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable bonds, insurance, taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include quotes on supplier's and subcontractor's letterhead for the requested change.
    - e. 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 time before requesting an extension of the Contract Time.

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- 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 bonds, insurance, taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. 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 time before requesting an extension of the Contract Time.
  - 6. 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, or format as approved by the Owner.

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.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714, or format as approved by the Owner. 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.



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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600



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SECTION 012900 - 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.

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: 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 seven days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
  - 1. Cover Sheet Identification: Include the following Project identification on the Schedule of Values:
    - a. Project name and location.
    - b. Name of Architect.

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- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.
- f. Certification that Record Drawings have been updated and verified.
2. Submit draft of AIA Document G703 Continuation Sheets.
3. Arrange the Schedule of Values in tabular form, a break down 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.
    - 1) 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, providing at least one line item for each Specification Section. Provide several line items for principal subcontract amounts, where appropriate.
5. For Division 22 and 23 work, provide the following additional line item breakdown of the mechanical subcontractor's work for each Application for Payment:
  - a. Ductwork Systems.
  - b. HVAC Piping Systems.
  - c. HVAC Equipment.
  - d. HVAC Controls.
  - e. Plumbing, including fixtures and piping.
6. Documentation: Submit proper documentation for the amounts being requisitioned from subcontractors and material suppliers with each Application for Payment.
7. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
8. 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.
  - b. Only major long lead delivery items may be considered for off-site storage (Example: Long lead custom mechanical unit). Standard order and production materials and products shall be delivered to the site before including in Application of Payment on such items.
9. 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.
10. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
11. Each item in the Schedule of Values and Applications for Payment shall be complete.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the Schedule of Values.

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12. 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.

C. The Contractor shall furnish to the Architect at the beginning of the project an expected monthly requisition estimate for the Owner's use in planning funding.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment 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: Progress payments Applications shall be submitted to Architect not less than 7 days before monthly progress meeting, but in no case later than the first day of the month. The period covered by each Application for Payment is one month, ending on the last day of the same month.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned 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.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment 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.

F. 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 who is lawfully entitled to a lien.

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5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Record Drawing Updates: With each Application of Payment, record documents shall be maintained and current for all trades, available for viewing at a central location.
- 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. Submittals Schedule (preliminary if not final).
  5. List of Contractor's staff assignments.
  6. List of Contractor's principal consultants.
  7. Copies of building permits and other required permits.
  8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  9. Initial progress report.
  10. Report of preconstruction conference.
  11. Certificates of insurance and insurance policies.
  12. Performance and payment bonds.
- I. Progress Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of progress Applications for Payment include the following:
1. Contractor's Construction Schedule update.
  2. Submittals for Work being requisitioned for are complete and approved.
  3. Submit list of completed tests, checklists, commissioning, reports, and similar requirements for the work are submitted and in compliance with the Contract Documents.
  4. Minutes of previous month's progress meeting have been distributed.
  5. Record drawings and documents are current.
- J. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion less applicable retainage, 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.
- K. 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, record documents, operation and maintenance data, and demonstration and training.
  2. Mechanical commissioning completed and all systems in full compliance.
  3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  4. Updated final statement, accounting for final changes to the Contract Sum.

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5. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.
6. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
7. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
8. AIA Document G707, "Consent of Surety to Final Payment."
9. Evidence that claims have been settled.
10. 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.
11. Final, liquidated damages settlement statement, if applicable.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900





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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

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 provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
- B. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
  - 2. Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical. Coordinate location of pipes, conduits, ducts and similar items in confined areas to assure proper fit and access. Contractor is responsible for handling interferences created by the work of subcontractors (example, sprinkler pipe interfering with installation of duct work; duct work interfering with installation of light fixtures, overhead construction interfering with installation of finish ceilings at proper height).
  - 5. Coordinate the work to provide smoke and fire seals for component interfaces and penetrations of smoke walls and fire rated construction.

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- B. Coordinate with contractors doing work for the Owner under separate contracts.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. 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. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  - 9. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

#### 1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings for mechanical, electrical, plumbing and sprinkler to coordinate as determined by the Contractor and subcontractors, for locations of limited space availability to provide maximum utilization of space for efficient installation of different components, and, for installation coordination for products and materials fabricated by separate entities to assure proper fit.
  - 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, 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. Number of Copies: Submit two opaque copies of each submittal. Architect will return one copy.
  - 3. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

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4. If the Contractor and subcontractors choose to not prepare coordination drawings, the Contractor and subcontractors will not be given compensation for revising installed work due to conflicts that would have been evident from the preparation of coordination drawings.

- B. Key Personnel Names: Within 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.

#### 1.5 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.

#### 1.6 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: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 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).

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- 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. Use of the premises.
  - m. Work restrictions.
  - n. Owner's occupancy requirements.
  - o. Responsibility for temporary facilities and controls.
  - p. Completion of insulation over air/vapor barrier before application of temporary heat.
  - q. Construction waste management and recycling.
  - r. Parking availability.
  - s. Office, work, and storage areas.
  - t. Equipment deliveries and priorities.
  - u. First aid.
  - v. Security.
  - w. Progress cleaning.
  - x. Working hours.
3. Minutes: Record and distribute meeting minutes.
- a. Include action items and responsible party.
- C. Preinstallation Conferences: Conduct a preinstallation 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.

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- 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.
  - z. Record drawing process.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
    - a. Include action items and responsible party.
  - 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. Monthly Progress Meetings: Conduct progress meetings at monthly 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. Application for Payment: Contractor shall bring copy of Application for Payment to meeting. Review Application for Payment and required attachments, including record drawing and documents status, waivers of mechanic's liens, list of completed tests, checklists, commissioning, reports, and similar requirements for the work are submitted and in compliance with the Contract Documents.
    - c. 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.

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- 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: Record and distribute the meeting minutes.
    - a. Include action items and responsible party.
  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/Progress Meetings: Conduct Project coordination/progress meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as monthly progress meetings and preinstallation conferences.
1. Attendees: 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.

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- 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. Conduct coordination meetings with the mechanical, plumbing, sprinkler and electrical trades. Before the trades start work in an area of the building, make field measurements, review structural clearances and locations of ducts, pipes, conduits, light fixtures, equipment and other items that affect location and proper fit. Prepare coordination drawings to maximize utilization of space for efficient installation of different components. Verify depths and clearances before fabrication of ductwork.
4. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- a. Include action items and responsible party.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100





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SECTION 013200 - 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. Field condition reports.
  - 6. 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 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

- A. Qualification Data: For scheduling consultant.
- B. Submittals Schedule: Submit three copies of schedule. 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 Construction Schedule: Submit two copies.
- D. Contractor's Construction Schedule: Submit two copies of initial schedule, large enough to show entire schedule for entire construction period.

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- E. Daily Construction Reports: Submit two copies at weekly intervals.
- F. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- G. Special Reports: Submit two copies at time of unusual event.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Allow for time in the construction schedule for materials to dry before they are enclosed to prevent the growth of mold and bacteria.
- C. 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.

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. Submittals shall be scheduled in an orderly fashion that spreads the submissions out over a period of time to permit Architect adequate opportunity to schedule personnel for timely reviews. Where submittals are not required to be submitted concurrently, or do not require coordination with other submittals, Contractor shall review, stamp, and submit as submittals are received. Contractor shall not receive submittals, hold them, and then release them to the Architect all at once.
  - 3. 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.
  - 4. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

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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 commencement of the Work 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.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type or CPM network analysis type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.5 REPORTS

- A. 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. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports to Architect 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, response by Contractor's personnel, evaluation of

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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. 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.
  
- B. 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.

END OF SECTION 013200

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SECTION 013300 - 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 "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
  - 5. Division 01 Section "Closeout Procedures" for submitting warranties.
  - 6. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 8. Division 01 Section "Demonstration and Training" for submitting video disks of demonstration of equipment and training of Owner's personnel.
  - 9. 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. 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 require sequential activity.

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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.
  
- B. 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.
  
- C. 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 minimum 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. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 days minimum for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days minimum for initial review of each submittal.
    - a. Submittals that require sequential review include, but are not limited to the following components of the Work:
      - 1) Concrete.
      - 2) Masonry.
      - 3) Structural.
      - 4) Doors, frames and door hardware.
      - 5) Mechanical.
      - 6) Electrical.
      - 7) Plumbing.
      - 8) Fire Protection.
      - 9) Civil Engineering,
      - 10) Landscape Architecture
  
- D. 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 approximately 6 by 8 inches 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.

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- 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., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.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.
- E. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals. Mark with dark colored pen that permits photocopying. Do not use highlighter.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- 1. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. 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.
    - 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.
- H. 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 approved.

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- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating approval taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided at the cost of preparation to Contractor for Contractor's use in connection with Project, subject to the terms and conditions of a Contractor's Use of Cadd Files Agreement that includes the following conditions:
  - 1. At cost of production, contractor may obtain copies of Architect's CAD drawings.
  - 2. Architect's CAD drawings are not Contract Documents.
  - 3. Use of Architect's CAD drawings is solely for the convenience of the contractor. Architect's CAD drawings shall be compared to the Contract Documents to the same extent that submittal drawing preparation would require.
  - 4. Contractor's use of Architect's CAD drawings shall in no way relieve the contractor of the requirement to comply with the contract documents.
  - 5. Contractor's use of Architect's CAD drawings does not in any way alter the contractor's obligation for coordination and for the means and methods of construction..

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
  - 1. Mark with dark colored pen that permits photocopying. Do not use highlighter.
- 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.



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- 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 Copies: Electronically submit each submittal separately in .pdf format to Architect. If paper copies are sent, submit three copies of Product Data, unless otherwise indicated. Architect will return one copy for reproduction and distribution. Mark up and retain one returned copy as a Project Record Document and make additional copies where copies are required for operation and maintenance manuals.
- 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. Shopwork 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 8-1/2 by 11 inches but no larger than 30 by 40 inches.
  3. Submit Copies: Electronically submit each submittal separately in .pdf format to Architect. If paper copies are sent, submit three opaque copies of each submittal. Architect will retain two copies; Architect will return one copy for reproduction and distribution. Mark up and retain one returned copy as a Project Record Drawing and make additional copies where copies are required for operation and maintenance manuals.
- 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.

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- 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.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  - 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 three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
      - 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 three 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 three copies of product schedule or list, unless otherwise indicated. Architect will return one copy for reproduction and distribution.
    - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

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- H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- J. 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 three copies of subcontractor list, unless otherwise indicated. Architect will return one copy.
    - a. Mark up and retain one 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 two copies of each 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."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. 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.
- E. 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.
- F. 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.

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- G. **Manufacturer Certificates:** Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. **Product Certificates:** Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. **Material Certificates:** Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. **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.
- K. **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.
- L. **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.
- M. **Schedule of Tests and Inspections:** Comply with requirements specified in Division 1 Section "Quality Requirements."
- N. **Preconstruction Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- O. **Compatibility Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- P. **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.

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- Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- S. 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:
1. Preparation of substrates.
  2. Required substrate tolerances.
  3. Sequence of installation or erection.
  4. Required installation tolerances.
  5. Required adjustments.
  6. Recommendations for cleaning and protection.
- T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- U. 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.
- V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner at end of the project; do not submit to Architect. Maintain copy at the site for the duration of the construction.
1. Architect will not review submittals that include MSDSs and will return them.
- 2.3 DELEGATED DESIGN
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

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1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
  
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

### 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.
  1. The Contractor shall review submittals for completeness and compliance with the Contract Documents. If submittal contains substitutions, Contractor shall process substitutions in accordance with Division 01 Section "Product Requirements," and not part of specified Shop Drawings or Product Data submittals. Contractor is responsible for keeping Subcontractors on time with the submittal schedule. If the Contractor submits submittals that are repeatedly rejected, requiring the Architect to perform multiple reviews of the same submittal because of the failure to properly prepare and complete the submittals:
    - a. Owner will compensate Architect for such additional services.
    - b. Owner will deduct the amount of such compensation from the final payment to the Contractor.
  
- 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. Incomplete submittals will not be reviewed.
  
- 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.
  
- C. The Architect's marking of "Approved," "Approved as Noted," "No Exceptions Taken" or similar verbiage means submittal has been reviewed for general conformance to the contract

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documents only and does not mean unqualified acceptance. The Contractor is fully responsible for compliance with the contract documents.

- D. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- E. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300





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SECTION 014000 - 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.
- 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 33 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

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indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.

- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. 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 tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar 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 is specified and the standards 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

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appropriate, for the context of requirements. 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 and materials complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.
- 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.

#### 1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

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- 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 who 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 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. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

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- d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
  - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
  - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. 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 seven 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 seven 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.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 33.

## 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. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. 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.
- 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.

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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 01 Section "Submittal Procedures."
- D. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect 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.
- F. **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. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. **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.

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1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. 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 commencement of the Work.
1. 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.
- 1.8 SPECIAL TESTS AND INSPECTIONS
- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, in compliance with the IBC Code.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 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.
- 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.

3.2 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 01 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 014000





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SECTION 014200 - REFERENCES

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 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 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.

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- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should 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, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com).
  - 2. AAMA - American Architectural Manufacturers Association; [www.aamanet.org](http://www.aamanet.org).
  - 3. AAPFCO - Association of American Plant Food Control Officials; [www.aapfco.org](http://www.aapfco.org).
  - 4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
  - 5. AATCC - American Association of Textile Chemists and Colorists; [www.aatcc.org](http://www.aatcc.org).
  - 6. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 7. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org).
  - 8. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
  - 9. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
  - 10. AF&PA - American Forest & Paper Association; [www.afandpa.org](http://www.afandpa.org).
  - 11. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
  - 12. AHAM - Association of Home Appliance Manufacturers; [www.aham.org](http://www.aham.org).
  - 13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
  - 14. AI - Asphalt Institute; [www.asphaltinstitute.org](http://www.asphaltinstitute.org).
  - 15. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
  - 16. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
  - 17. AISI - American Iron and Steel Institute; [www.steel.org](http://www.steel.org).
  - 18. AITC - American Institute of Timber Construction; [www.aitc-glulam.org](http://www.aitc-glulam.org).
  - 19. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
  - 20. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 21. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
  - 22. APA - APA - The Engineered Wood Association; [www.apawood.org](http://www.apawood.org).
  - 23. APA - Architectural Precast Association; [www.archprecast.org](http://www.archprecast.org).
  - 24. API - American Petroleum Institute; [www.api.org](http://www.api.org).
  - 25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
  - 26. ARI - American Refrigeration Institute; (See AHRI).
  - 27. ARMA - Asphalt Roofing Manufacturers Association; [www.asphaltroofing.org](http://www.asphaltroofing.org).

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28. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
31. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
32. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
33. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
34. ASTM - ASTM International; (American Society for Testing and Materials International); [www.astm.org](http://www.astm.org).
35. ATIS - Alliance for Telecommunications Industry Solutions; [www.atis.org](http://www.atis.org).
36. AWEA - American Wind Energy Association; [www.awea.org](http://www.awea.org).
37. AWI - Architectural Woodwork Institute; [www.awinet.org](http://www.awinet.org).
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; [www.awmac.com](http://www.awmac.com).
39. AWWA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); [www.awpa.com](http://www.awpa.com).
40. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
41. AWWA - American Water Works Association; [www.awwa.org](http://www.awwa.org).
42. BHMA - Builders Hardware Manufacturers Association; [www.buildershardware.com](http://www.buildershardware.com).
43. BIA - Brick Industry Association (The); [www.gobrick.com](http://www.gobrick.com).
44. BICSI - BICSI, Inc.; [www.bicsi.org](http://www.bicsi.org).
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); [www.bifma.com](http://www.bifma.com).
46. BISSC - Baking Industry Sanitation Standards Committee; [www.bissc.org](http://www.bissc.org).
47. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); [www.bwfbadminton.org](http://www.bwfbadminton.org).
49. CDA - Copper Development Association; [www.copper.org](http://www.copper.org).
50. CEA - Canadian Electricity Association; [www.electricity.ca](http://www.electricity.ca).
51. CEA - Consumer Electronics Association; [www.ce.org](http://www.ce.org).
52. CFFA - Chemical Fabrics & Film Association, Inc.; [www.chemicalfabricsandfilm.com](http://www.chemicalfabricsandfilm.com).
53. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
54. CGA - Compressed Gas Association; [www.cganet.com](http://www.cganet.com).
55. CIMA - Cellulose Insulation Manufacturers Association; [www.cellulose.org](http://www.cellulose.org).
56. CISCA - Ceilings & Interior Systems Construction Association; [www.cisca.org](http://www.cisca.org).
57. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
58. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
59. CPA - Composite Panel Association; [www.pbmdf.com](http://www.pbmdf.com).
60. CRI - Carpet and Rug Institute (The); [www.carpet-rug.org](http://www.carpet-rug.org).
61. CRRC - Cool Roof Rating Council; [www.coolroofs.org](http://www.coolroofs.org).
62. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
63. CSA - Canadian Standards Association; [www.csa.ca](http://www.csa.ca).
64. CSA - CSA International; (Formerly: IAS - International Approval Services); [www.csa-international.org](http://www.csa-international.org).
65. CSI - Construction Specifications Institute (The); [www.csinet.org](http://www.csinet.org).

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66. CSSB - Cedar Shake & Shingle Bureau; [www.cedarbureau.org](http://www.cedarbureau.org).
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; [www.dasma.com](http://www.dasma.com).
70. DHI - Door and Hardware Institute; [www.dhi.org](http://www.dhi.org).
71. ECA - Electronic Components Association; [www.ec-central.org](http://www.ec-central.org).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECA).
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; [www.eima.com](http://www.eima.com).
75. EJMA - Expansion Joint Manufacturers Association, Inc.; [www.ejma.org](http://www.ejma.org).
76. ESD - ESD Association; (Electrostatic Discharge Association); [www.esda.org](http://www.esda.org).
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; [www.evo-world.org](http://www.evo-world.org).
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); [www.fiba.com](http://www.fiba.com).
80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); [www.fivb.org](http://www.fivb.org).
81. FM Approvals - FM Approvals LLC; [www.fmglobal.com](http://www.fmglobal.com).
82. FM Global - FM Global; (Formerly: FMG - FM Global); [www.fmglobal.com](http://www.fmglobal.com).
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; [www.floridarroof.com](http://www.floridarroof.com).
84. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
85. FSC - Forest Stewardship Council U.S.; [www.fscus.org](http://www.fscus.org).
86. GA - Gypsum Association; [www.gypsum.org](http://www.gypsum.org).
87. GANA - Glass Association of North America; [www.glasswebsite.com](http://www.glasswebsite.com).
88. GS - Green Seal; [www.greenseal.org](http://www.greenseal.org).
89. HI - Hydraulic Institute; [www.pumps.org](http://www.pumps.org).
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; [www.hpva.org](http://www.hpva.org).
93. HPW - H. P. White Laboratory, Inc.; [www.hpwhite.com](http://www.hpwhite.com).
94. IAPSC - International Association of Professional Security Consultants; [www.iapsc.org](http://www.iapsc.org).
95. IAS - International Approval Services; (See CSA).
96. ICBO - International Conference of Building Officials; (See ICC).
97. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
98. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
99. ICPA - International Cast Polymer Alliance; [www.icpa-hq.org](http://www.icpa-hq.org).
100. ICRI - International Concrete Repair Institute, Inc.; [www.icri.org](http://www.icri.org).
101. IEC - International Electrotechnical Commission; [www.iec.ch](http://www.iec.ch).
102. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
103. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); [www.ies.org](http://www.ies.org).
104. IESNA - Illuminating Engineering Society of North America; (See IES).
105. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org).
106. IGMMA - Insulating Glass Manufacturers Alliance; [www.igmaonline.org](http://www.igmaonline.org).
107. IGSHA - International Ground Source Heat Pump Association; [www.igsha.okstate.edu](http://www.igsha.okstate.edu).
108. ILI - Indiana Limestone Institute of America, Inc.; [www.iliai.com](http://www.iliai.com).

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109. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).
110. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); [www.isa.org](http://www.isa.org).
111. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
112. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); [www.isfanow.org](http://www.isfanow.org).
113. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
114. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
115. ITU - International Telecommunication Union; [www.itu.int/home](http://www.itu.int/home).
116. KCMA - Kitchen Cabinet Manufacturers Association; [www.kcma.org](http://www.kcma.org).
117. LMA - Laminating Materials Association; (See CPA).
118. LPI - Lightning Protection Institute; [www.lightning.org](http://www.lightning.org).
119. MBMA - Metal Building Manufacturers Association; [www.mbma.com](http://www.mbma.com).
120. MCA - Metal Construction Association; [www.metalconstruction.org](http://www.metalconstruction.org).
121. MFMA - Maple Flooring Manufacturers Association, Inc.; [www.maplefloor.org](http://www.maplefloor.org).
122. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
123. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
124. MIA - Marble Institute of America; [www.marble-institute.com](http://www.marble-institute.com).
125. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); [www.wmmpa.com](http://www.wmmpa.com).
126. MPI - Master Painters Institute; [www.paintinfo.com](http://www.paintinfo.com).
127. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
128. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
129. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
130. NADCA - National Air Duct Cleaners Association; [www.nadca.com](http://www.nadca.com).
131. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
132. NBGQA - National Building Granite Quarries Association, Inc.; [www.nbgqa.com](http://www.nbgqa.com).
133. NCAA - National Collegiate Athletic Association (The); [www.ncaa.org](http://www.ncaa.org).
134. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
135. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
136. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
137. NeLMA - Northeastern Lumber Manufacturers Association; [www.nelma.org](http://www.nelma.org).
138. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
139. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
140. NFHS - National Federation of State High School Associations; [www.nfhs.org](http://www.nfhs.org).
141. NFPA - NFPA; (National Fire Protection Association); [www.nfpa.org](http://www.nfpa.org).
142. NFPA - NFPA International; (See NFPA).
143. NFRC - National Fenestration Rating Council; [www.nfrc.org](http://www.nfrc.org).
144. NHLA - National Hardwood Lumber Association; [www.nhla.com](http://www.nhla.com).
145. NLGA - National Lumber Grades Authority; [www.nlga.org](http://www.nlga.org).
146. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
147. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
148. NRCA - National Roofing Contractors Association; [www.nrca.net](http://www.nrca.net).
149. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).

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150. NSF - NSF International; (National Sanitation Foundation International); [www.nsf.org](http://www.nsf.org).
151. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
152. NSSGA - National Stone, Sand & Gravel Association; [www.nssga.org](http://www.nssga.org).
153. NTMA - National Terrazzo & Mosaic Association, Inc. (The); [www.ntma.com](http://www.ntma.com).
154. NWFA - National Wood Flooring Association; [www.nwfa.org](http://www.nwfa.org).
155. PCI - Precast/Prestressed Concrete Institute; [www.pci.org](http://www.pci.org).
156. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
157. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); [www.plasa.org](http://www.plasa.org).
158. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
159. RFCI - Resilient Floor Covering Institute; [www.rfci.com](http://www.rfci.com).
160. RIS - Redwood Inspection Service; [www.redwoodinspection.com](http://www.redwoodinspection.com).
161. SAE - SAE International; (Society of Automotive Engineers); [www.sae.org](http://www.sae.org).
162. SCTE - Society of Cable Telecommunications Engineers; [www.scte.org](http://www.scte.org).
163. SDI - Steel Deck Institute; [www.sdi.org](http://www.sdi.org).
164. SDI - Steel Door Institute; [www.steeldoor.org](http://www.steeldoor.org).
165. SEFA - Scientific Equipment and Furniture Association; [www.sefalabs.com](http://www.sefalabs.com).
166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
167. SIA - Security Industry Association; [www.siaonline.org](http://www.siaonline.org).
168. SJI - Steel Joist Institute; [www.steeljoist.org](http://www.steeljoist.org).
169. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
171. SMPTE - Society of Motion Picture and Television Engineers; [www.smpte.org](http://www.smpte.org).
172. SPFA - Spray Polyurethane Foam Alliance; [www.sprayfoam.org](http://www.sprayfoam.org).
173. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org).
174. SPRI - Single Ply Roofing Industry; [www.spri.org](http://www.spri.org).
175. SRCC - Solar Rating and Certification Corporation; [www.solar-rating.org](http://www.solar-rating.org).
176. SSINA - Specialty Steel Industry of North America; [www.ssina.com](http://www.ssina.com).
177. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
178. STI - Steel Tank Institute; [www.steeltank.com](http://www.steeltank.com).
179. SWI - Steel Window Institute; [www.steelwindows.com](http://www.steelwindows.com).
180. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
181. TCA - Tilt-Up Concrete Association; [www.tilt-up.org](http://www.tilt-up.org).
182. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); [www.tileusa.com](http://www.tileusa.com).
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; [www.tema.org](http://www.tema.org).
184. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); [www.tiaonline.org](http://www.tiaonline.org).
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; [www.masonrysociety.org](http://www.masonrysociety.org).
187. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
188. TPI - Turfgrass Producers International; [www.turfgrassod.org](http://www.turfgrassod.org).
189. TRI - Tile Roofing Institute; [www.tilerroofing.org](http://www.tilerroofing.org).
190. UBC - Uniform Building Code; (See ICC).

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191. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).
192. UNI - Uni-Bell PVC Pipe Association; [www.uni-bell.org](http://www.uni-bell.org).
193. USAV - USA Volleyball; [www.usavolleyball.org](http://www.usavolleyball.org).
194. USGBC - U.S. Green Building Council; [www.usgbc.org](http://www.usgbc.org).
195. USITT - United States Institute for Theatre Technology, Inc.; [www.usitt.org](http://www.usitt.org).
196. WASTEC - Waste Equipment Technology Association; [www.wastec.org](http://www.wastec.org).
197. WCLIB - West Coast Lumber Inspection Bureau; [www.wclib.org](http://www.wclib.org).
198. WCMA - Window Covering Manufacturers Association; [www.wcmanet.org](http://www.wcmanet.org).
199. WDMA - Window & Door Manufacturers Association; [www.wdma.com](http://www.wdma.com).
200. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); [www.wicnet.org](http://www.wicnet.org).
201. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
202. WSRCA - Western States Roofing Contractors Association; [www.wsrca.com](http://www.wsrca.com).
203. WPA - Western Wood Products Association; [www.wwpa.org](http://www.wwpa.org).

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut für Normung e.V.; [www.din.de](http://www.din.de).
2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
8. FG - Federal Government Publications; [www.gpo.gov](http://www.gpo.gov).
9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
13. SD - Department of State; [www.state.gov](http://www.state.gov).
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; [www.trb.org](http://www.trb.org).
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).

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17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
  18. USP - U.S. Pharmacopeia; [www.usp.org](http://www.usp.org).
  19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).
- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
  3. DSCC - Defense Supply Center Columbus; (See FS).
  4. FED-STD - Federal Standard; (See FS).
  5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
    - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
    - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/ccb](http://www.wbdg.org/ccb).
  6. MILSPEC - Military Specification and Standards; (See DOD).
  7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
  8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
  2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
  3. CDHS - California Department of Health Services; (See CDPH).
  4. CDPH - California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
  5. CPUC - California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
  6. SCAQMD - South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
  7. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry; <http://txforestservation.tamu.edu>.



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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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 requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
  - 1. Sewers and drainage.
  - 2. Water service and distribution.
  - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
  - 4. Heating and cooling facilities.
  - 5. Ventilation.
  - 6. Electric power service.
  - 7. Lighting.
  - 8. Telephone service.
  - 9. Internet service.
- C. Support facilities include, but are not limited to, the following:
  - 1. Dewatering facilities and drains.
  - 2. Project identification and temporary signs.
  - 3. Waste disposal facilities.
  - 4. Field offices.
  - 5. Storage and fabrication sheds.
  - 6. Lifts and hoists.
  - 7. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
  - 1. Environmental protection.
  - 2. Stormwater control.
  - 3. Tree and plant protection.
  - 4. Pest control.
  - 5. Security enclosure and lockup.
  - 6. Barricades, warning signs, and lights.
  - 7. Covered walkways.
  - 8. Temporary enclosures.
  - 9. Fire protection.
- E. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.

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2. Division 1 Section "Execution Requirements" for progress cleaning requirements.
3. Divisions 2 through 16 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
  1. Owner's construction forces.
  2. Owner.
  3. Occupants of Project.
  4. Architect.
  5. Testing agencies.
  6. Subcontractors.
  7. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.
- C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.
- D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site. Pay utility costs for field offices, including the Architects office, for the duration of the project.
- E. Telephone Service: Make arrangements and pay costs for installation and operation of telephone service for Contractor's Offices, including monthly charges and necessary accounting of toll calls. Toll calls shall be paid for by the party making the call.
- F. Fuel, power and other utility charges incurred for testing and start-up of equipment shall be paid for by the Contractor as part of the work.

1.5 SUBMITTALS

- A. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements to protect install concrete and masonry.

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1.6 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
  - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
  - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. The Contractor is responsible for the implementation, monitoring, and maintenance of job site safety program for the duration of the contract.

1.7 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
  - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
  - 1. Keep temporary services and facilities clean and neat.
  - 2. Relocate temporary services and facilities as required by progress of the Work.
- C. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site. Construction noise from machinery, equipment, construction traffic, hammering and similar loud noises shall be restricted to the hours of 7:00 a.m. to 7:00 p.m. or local ordinances, whichever is more restrictive. Obey State and local noise ordinances.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- D. Water: Potable.

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2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Field Offices: Not required. Utilize one of the rooms in the renovation area for office.
- C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- D. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- E. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- F. Heating Equipment: Use of permanent heating system will be permitted. If heat is needed before permanent heating system is available, provide gas/oil indirect fired space heaters that are UL labeled and approved for construction space heating by appropriate agency. Provide adequate ventilation and thermostatic control. Heaters shall be located outside the building and combustion gases shall be vented outside the building. Maintain observation of units in operation.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
- G. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- H. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve 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.

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3.2 TEMPORARY UTILITY INSTALLATION AND OPERATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
  3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
1. Provide rubber hoses as necessary to serve Project site.
  2. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Sanitary Facilities: Provide temporary toilets and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
  3. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
  4. Locate toilets and drinking-water fixtures so personnel need not walk more than two stories vertically or 200 feet (60 m) horizontally to facilities.
  5. Use of the Owner's existing toilet facilities will not be permitted.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Temporary heating units shall be indirect fired units vented to the exterior. Use of direct fired fossil fuel fired units is not permitted.
1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed. Maintain higher minimum temperatures before, during, and after installations of materials and finishes as specified in the individual Sections of Divisions 2 through 16.
  2. Interior concrete slabs on grade, footings and foundations not below the frost line shall be protected from freezing either by heating or protecting with insulation until substantial completion.
  3. Permanent air heating systems may be used to provide heat only when finishes are complete enough to eliminate construction dust and with the prior approval of the

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- Architect and Owner. Cover diffuser and grilles with filter cloth to protect from dust. Pay of operating costs resulting from the use of the permanent heating system prior to "substantial completion" unless otherwise agreed to by the Owner. Extend warranty periods for such systems at the Contractor's expense so that the Owner gets the fully intended warranty period effective the day of "Substantial Completion".
4. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and replacement of filters and worn or consumed parts.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. All spaces shall be mechanically ventilated to protect occupants from application and installation of odor causing materials. The area where odor-causing material is being used shall be isolated from the new and existing ventilation system.
  2. Negative pressure shall be maintained within the construction areas inside the existing building to prevent the spread of dust and odors. Route ductwork from the negative-air fans to the exterior of the building, filtering the air in the duct prior to being discharged, by means of a standard furnace air filter. The negative air pressure system shall be activated prior to the commencement of work each day, and remain operating until one-half hour after the stop of work for each day.
  3. No work creating fumes shall be done in occupied areas of existing building while it is occupied by the Owner. Ventilation shall be maintained for a period of 24 hours or until release of fumes has subsided, whichever is longer.
  4. The permanent ventilation system shall be fully operational and run full time for a minimum of 2 weeks before date established for Substantial Completion. Cost of operation shall be included as part of the work.
- F. Temporary Electric Power Service: See Section Division 26 for Electrical Work.
- G. Temporary Lighting: See Division 26 for Electrical Work.
- H. Telephone Service: Provide temporary telephone service throughout construction period for use by contractor.
1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Engineers' offices.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  2. Provide an answering machine on superintendent's telephone.



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3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
  2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
  3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Provide temporary traffic controls at junction of project site entrance with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
- C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
  2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
  3. Remove snow and ice as required to minimize accumulations.
- D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated. Include name of project, and names of Owner, Architect and Contractor.
  2. Prepare temporary signs to provide directional information to construction personnel and visitors.
  3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in size of 4 by 8 feet and 3/4 inch thickness, unless otherwise indicated. Support on posts or framing of preservative-treated wood or steel.
  4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
  2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials.

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Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

3. Each trade shall pick up the debris and rubbish generated by that trade and dispose of in the appropriate dumpsters furnished by the General Contractor.

- F. Contractor's Field Office: Not required. Utilize one of the renovation rooms for office.
- G. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
- H. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
  - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- E. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from unauthorized entry, exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

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2. Vertical Openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
  3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
  4. Install tarpaulins securely using wood framing and other materials.
  5. Provide temporary enclosures for exterior concrete, masonry, and other trades requiring heat, so as to properly protect Work and maintain specified temperatures.
  6. Provide enclosures for artificial shade and wind breaks as required for hot weather protection of concrete placements and masonry. Coordinate with the subcontractors.
- G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
    - a. Field Offices: Class A stored-pressure water-type extinguishers.
    - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
    - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide 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 firefighting. Prohibit smoking in hazardous fire-exposure areas.
  4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
  5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
  6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- H. Covered Walkway: Erect a structurally adequate, protective covered walkway for passage of persons at exits from the building with potential danger from falling objects. Comply with regulations of authorities having jurisdiction.
1. Provide covered walkway through and/or around "Core Area" during construction to protect personnel passing through construction area to the various wings of the existing building.
- 3.5 OPERATION, TERMINATION, AND REMOVAL
- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
  - B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

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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. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Flooring Protection: Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during construction period. Use protection methods indicated or recommended by flooring manufacturer.
1. Cover flooring with undyed, untreated building paper at high traffic areas until inspection for Substantial Completion.
  2. Do not move heavy and sharp objects directly over flooring. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- D. Restoration of Roadways and Pavement: Roadways, pavements and curbs that are broken, damaged, settled, or otherwise defective as a result of receiving, handling, storage of materials or the performance of any work under this Contract, shall be fully restored to the satisfaction of the authorities having jurisdiction.
- E. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- F. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been 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 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 property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
  - 1. Division 01 Section "References" for applicable industry standards for products specified.
  - 2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
  - 3. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. 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, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. 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.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. 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.

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1.4 SUBMITTALS

- A. Substitution Requests: Submit request to Architect and Owner in accordance with provisions in Part 2 "Product Substitutions" Article.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.
  - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  - 4. Store cementitious products and materials on elevated platforms.
  - 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 7. Protect stored products from damage and liquids from freezing.
  - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

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- D. During the construction process, meet or exceed the following minimum requirements to prevent the growth of mold and bacteria:
1. Keep building materials dry. Wood, porous insulation, paper, fabric, and similar absorptive materials shall be kept dry to prevent the growth of mold and bacteria. Cover these materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.
  2. Replace water-damaged materials, or dry within 24 hours, due to the possibility of mold and bacterial growth. Materials that are damp or wet for more than 24 hours shall be discarded if evidence of mold occurs.
  3. Immediately remove materials showing signs of mold and mildew, including materials with exposed moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.
  4. Require that moisture sensitive materials be delivered dry and protected from the elements.
  5. Allow for time in the construction schedule for materials to dry before they are enclosed.

#### 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. **Manufacturer's Warranty:** Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. **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.
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
  2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
  3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. **Submittal Time:** Comply with requirements in Division 01 Section "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

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2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, that complies with requirements. .
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, that complies with requirements.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
  - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.



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- b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 PRODUCT SUBSTITUTIONS

A. Substitution Requests: Subcontractor substitution requests shall be submitted by the Contractor during the subcontractor bidding period. Requests for substitutions shall be submitted not less than 10 days before bids are due. Submit three copies of each request for consideration during the bid pricing period. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. Substitutions found acceptable will be issued by written addendum from the Architect. Contractor submitting substitutions after pricing is received will not be given additional compensation for rejected submittals.

1. Substitution Request Form: Use form attached at end of Section.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
  - a. Statement indicating why specified material or product cannot be provided.
  - b. Reasons why the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable.
  - c. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate subcontractors, that will be necessary to accommodate proposed substitution.
  - d. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Requested substitution is compatible with, and has been coordinated with other portions of the Work. All sizes, dimensions, locations for connections to other items as designed, clearances from building structure and other equipment have been verified and is acknowledged in the substitution request.
  - f. If requested substitution involves more than one subcontractor, 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 subcontractors involved.
  - g. Requested substitution does not require extensive revisions to the Contract Documents.
  - h. Samples, where applicable or requested.
  - i. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - j. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - k. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
  - l. Requested substitution provides specified warranty.

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- m. 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 lack of availability or delays in delivery.
  - n. Cost information, including a proposal of change, if any, in the Contract Sum.
  - o. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
  - p. Requested substitution will be acceptable to local authorities having jurisdiction.
  - q. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- B. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation. Architect will notify Contractor of acceptance or rejection of proposed substitution by addendum or written notification as applicable.
- 1. Form of Acceptance: Addendum or Change Order, as applicable.
  - 2. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. If differences discovered later that were not identified on the substitution request are found that make the substitution unacceptable, it will be reason for rejection and replacement, regardless if the substitution has been installed, at no additional cost to the Owner.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SUBSTITUTION REQUEST FORM

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_

To: \_\_\_\_\_ From: \_\_\_\_\_

Re: \_\_\_\_\_ Date: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_

Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model No. \_\_\_\_\_

Attached data includes product description, specifications, drawings, and performance and test data adequate for evaluation of the request: applicable portions of the data are clearly identified. Provide substitution documentation required by Article 2.2 of Section 016000.

Attached data also includes a description of changes to the Contract Documents that the proposed substitutions will require for its proper installation.

The Undersigned certifies:

1. Acknowledges the requirement of, and that the substitution request is in compliance with Article 2.2 of Section 016000, and requirements contained in the General Conditions of the Contract.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner. All sizes, dimensions, locations for connections to other items as designed, clearances from building structure and other equipment have been verified.
4. Will remove substitution and pay all costs if differences discovered later that were not identified on the substitution request are found that make the substitution unacceptable with no additional cost to Owner.
4. Waive claims for additional costs or time extension that may subsequently become apparent.
5. Will reimburse Owner and Architect for review or redesign services associated with substitution.

Submitted By: \_\_\_\_\_

Signed By: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-Mail: \_\_\_\_\_

ARCHITECTS REVIEW AND ACTION

- Submission approved - Make submittals in accordance with Specification Section 013300.  
 Submission approved as noted - Make submittals in accordance with Specification Section 013300.  
 Submission rejected - Use specified materials.  
 Submission request received too late - Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

Supporting Data Attached:  Drawings  Product Data  Samples  Tests  Reports  
 Comparison list  Other



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SECTION 017300 - EXECUTION 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 general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. General installation of products.
  - 2. Coordination of Owner-installed products.
  - 3. Progress cleaning.
  - 4. Starting and adjusting.
  - 5. Protection of installed construction.
  - 6. Correction of the Work.
- B. Related Sections include the following:
  - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
  - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
  - 3. 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.
  - 4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

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.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate

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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.

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3.3 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, unless indicated otherwise.
- 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. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. 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.
- H. 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.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
  - 1. No asbestos containing materials shall be used in the work.

3.4 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.

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- 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. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

### 3.5 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 80 deg F.
  - 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 areas where work is in progress to the level of cleanliness necessary for proper execution of the Work. It is the Contractor's responsibility for job site safety.
  - 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.
    - a. Clean interior spaces prior to the start of finish painting, and continue cleaning on an as-needed basis until painting is finished.
    - b. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.
  - 3. Remove materials and debris that create tripping hazards.
- 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 dirt, debris and garbage from concealed spaces, including stud cavities 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.



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- 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.

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- 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 01 Section "Quality Requirements."

3.7 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.

3.8 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.

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- 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 017300

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SECTION 017320 - 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
  - 1. For correction of installed work.
  - 2. For repairs due to testing.
- B. Related Sections include the following:
  - 1. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - 2. Division 07 Section "Penetration Firestopping" for patching fire-rated construction penetrations.
  - 3. Division 07 Section "Fire-Resistive Joint Systems" for patching fire-rated construction perimeter joints.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place 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 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a 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. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
  - 2. 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.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

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- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
1. Primary operational systems and equipment.
  2. Air or smoke barriers.
  3. Fire-suppression systems.
  4. Mechanical systems piping and ducts.
  5. Control systems.
  6. Communication systems.
  7. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
1. Water, moisture, or vapor barriers.
  2. Membranes and flashings.
  3. Exterior curtain-wall construction.
  4. Equipment supports.
  5. Piping, ductwork, vessels, and equipment.
  6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and 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. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  - 5. Proceed with patching after construction operations requiring cutting are complete.

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- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: 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.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017320

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SECTION 017700 - CLOSEOUT 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 contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Warranties.
  - 3. Final cleaning.
- B. Related Sections include the following:
  - 1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
  - 2. Division 01 Section "Execution Requirements" for progress cleaning of Project site.
  - 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 6. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, the Contractor shall complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
  - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

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7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting. Wipe down equipment, including mechanical, electrical and teldata equipment in public areas and equipment rooms.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
15. Submit initial draft copy of operation and maintenance manuals at least 15 days before requesting inspection for Substantial Completion.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
5. Extra materials, spares and attic stock have been turned over to the Owner.
6. Demonstration and training is complete.
7. Final copies of operation and maintenance manuals have been delivered to the Owner.
8. All warranties have been submitted.
9. Final record documents have been delivered to the Architect.
10. Notarized certificate affirming that no asbestos containing materials were incorporated into the Work.



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- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 INSPECTION FEES

- A. If Architect Performs Reinspections Due to Failure of Work to Comply with the Claims of Status of Completion Made by Contractor, Or, Should Contractor fail to complete the work, Or, Should Contractor fail to promptly correct warranty items or work later found to be deficient:
  - 1. Owner will compensate Architect for such additional services.
  - 2. Owner will deduct amount of such compensation from final payment to Contractor.
- B. If the Work is not completed by date set in the Agreement, and the Architect needs to perform additional Contract Administrative and on site observation duties:
  - 1. Owner will compensate Architect for such additional services.
  - 2. Owner will deduct amount of such compensation from final payment to Contractor.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: List shall be prepared by the Contractor. Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.
  - 4. Owner and Architect will supplement list with additional items found incomplete and additional items needing correction.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated in the contract documents.
  - 1. Unless indicated otherwise, all warranties shall commence on the date of Substantial Completion.

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- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Submit final warranties as a package for the entire project, assembled and identified as described below.
  - 2. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark 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 Installer.
  - 4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  - 5. Electronic Media: Submit copy of warranty binder on CD-R in .PDF format. Bookmark based on the table of contents, and for each warranty within each section.
  - 6. Provide additional copies of each warranty to include in operation and maintenance manuals.
- D. Warranty Response Time: The Contract shall respond and begin to take necessary action within 7 days of receipt of written notification from the Owner. Response time for life safety items, and for building perimeter security shall be within 24 hours of receipt of written notification from the Owner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

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1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
  - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
  - e. Remove snow and ice to provide safe access to building.
  - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - h. Sweep concrete floors broom clean in unoccupied spaces.
  - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
  - j. Resilient flooring shall be scrubbed and cleaned with cleaner recommended by the flooring manufacturer just prior to occupation by Owner. No-wax floors shall be cleaned and buffed in accordance with flooring manufacturer's requirements.
    - 1) VCT: Clean surface according to manufacturer's requirements and apply 4 coats of high quality cross-linked acrylic floor polish. Coordinate polish product with Owner's maintenance system
  - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces. Cleaning of windows shall be done just before Owner occupancy.
  - l. Remove labels that are not permanent.
  - m. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - n. Wipe surfaces of mechanical and electrical equipment, elevator equipment, teldata equipment and similar equipment in public areas and equipment rooms.. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - o. Replace parts subject to unusual operating conditions.
  - p. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - q. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - r. Clean ducts, blowers, and coils if units were operated without filters during construction.

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- s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - t. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

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SECTION 017823 - OPERATION AND MAINTENANCE DATA

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 preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Operation manuals for systems, subsystems, and equipment.
  - 3. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.
- B. Related Sections include the following:
  - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
  - 3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
  - 4. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Initial Submittal: Submit 1 draft copy of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments after final inspection.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit copy of each corrected manual within 15 days of receipt of Architect's comments.

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2. Electronic Media: Submit one copy in PDF format on CD-R with data bookmarked according to the project manual table of contents. Bookmark the listing of documents, systems and equipment.

## 1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

## PART 2 - PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
  1. List of documents.
  2. List of systems.
  3. List of equipment.
  4. Subcontractor list.
  5. Warranties
  6. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

### 2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
  1. Subject matter included in manual.
  2. Name and address of Project.

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3. Name and address of Owner.
  4. Date of submittal.
  5. Name, address, and telephone number of Contractor and primary subcontractors.
  6. Name and address of Architect.
  7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, D-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents but not greater than 2 inches, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets. Do not over fill D-ring, allowing 1/2-inch space for future additions.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment. Typewritten, drawn or photographic material shall be protected by clear plastic sleeves.
  4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
  5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. Maximum size of drawings to be included in the binders shall not exceed 11-by-17-inch. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and submit envelopes with manual. At appropriate locations in manual, insert typewritten pages indicating envelope, drawing titles, descriptions of contents, and drawing locations.
- E. Electronic Media: Submit one copy of each complete manual, including Record Shop Drawings and Product Data on CD-R in .PDF format. Bookmark based on the specifications table of contents and manual dividers.

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2.3 OPERATION MANUALS

- A. Content: Daily operations and management of systems and equipment. In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
  11. Emergency operations and shutdown information that must be immediately available during emergency situations to protect life and property and to minimize disruptions to building occupants.
- B. Descriptions: Include the following:
1. Product name and model number.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.



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2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.
  - 2. These copies of warranties are in addition to the warranty package required in Section 017700 "Closeout Procedures."

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.

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2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

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1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. **Manufacturers' Data:** Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. **Drawings:** Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Provide one copy of applicable record drawings in pdf format. Do not use original Project Record Documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823



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SECTION 017839 - PROJECT RECORD DOCUMENTS

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 Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Record Shop Drawings.
  - 5. Record Test Reports
- B. Related Sections include the following:
  - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
  - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Divisions 02 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Submit all project record documents as one submittal package.
- B. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of Record Drawings as follows:
    - a. Submit one set of marked-up Record Prints. Provide copy of each Drawing, whether or not changes and additional information were recorded.
      - 1) Electronic Media: Submit one copy in PDF format on CD-R. Bookmark based on the list of drawings.
- C. Record Specifications: Submit one hard copy and one copy on electronic media of Project's Specifications, including addenda and contract modifications.
  - 1. Electronic Media: In addition to paper copy, submit record copy of record specification on CD-R in .PDF format.
- D. Record Shop Drawings and Product Data: Submit one hard copy and one copy on electronic media of each Product Data submittal.
  - 1. Where Record Shop Drawings and Product Data is required as part of operation and maintenance manuals, submit marked-up Shop Drawings and Product Data as an insert in manual instead of submittal as Record Shop Drawings and Product Data. Insert typewritten pages indicating drawing titles, descriptions of contents, and Record Shop

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- Drawings and Product Data locations drawing locations that are part of operation and maintenance manuals.
2. Electronic Media: In addition to paper copy, submit record copy of record Shop Drawings and Product Data specification on CD-R in .PDF format. Bookmark Product Data based on the table of contents
- E. Directories: Subcontractor directory.
1. Submit one hard copy and one copy on electronic media CD-R in .PDF format.
- F. Record Test Reports: Submit one hard copy and one copy on electronic media of project Test Reports.
1. Electronic Media: In addition to paper copy, submit record copy of record Test Reports on CD-R in .PDF format. Bookmark Test Reports based on the project manual table of contents.

## PART 2 - PRODUCTS

### 2.1 RECORD (AS-BUILT) DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Changes made by field sketches and supplemental drawings.
    - m. Changes made as a result of requests for information (RFI's).
    - n. Details not on the original Contract Drawings.
    - o. Field records for variable and concealed conditions.
    - p. Record information on the Work that is shown only schematically.

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3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark field record sets during construction with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, Requests for Information (RFI's), and similar identification, where applicable.
7. Mechanical, Electrical and Plumbing record drawings shall be based on record site drawings and record floor plan drawings.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Electronic Media: Submit one copy in PDF format on CD-R with drawings bookmarked based on the list of drawings.
3. Identification: As follows:
  - a. Project name.
  - b. Date.
  - c. Designation "PROJECT RECORD DRAWINGS."
  - d. Name of Architect.
  - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions, change orders and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  5. Note related Change Orders, Record Product Data, Requests for Information (RFI's), and Record Drawings where applicable.
  6. Electronic Media: CD-R in .PDF format. Bookmark based on the project manual table of contents.

## 2.3 RECORD SHOP DRAWINGS AND PRODUCT DATA

- A. Preparation: Mark Shop Drawings and Product Data to indicate the actual product installation where installation varies substantially from that indicated in Shop Drawings and Product Data submittal.

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1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
4. Bind product data in heavy-duty, D-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents but not greater than 2 inches, and sized to receive 8-1/2-by-11-inch paper. Do not over fill D-ring, allowing 1/2 inch space for future additions.
5. Provide heavy paper dividers with plastic-covered tabs for each specification section with product data. Mark tab to identify the specification section. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
6. Identify each binder on the front and spine with the typed or printed title "PRODUCT DATA and SHOP DRAWINGS" Project name, and name of Contractor.
7. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. Maximum size of drawings to be included in the binders shall not exceed 11-by-17-inch. Fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and submit envelopes with manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations. Fold drawings to fit into letter size storage boxes.
8. Electronic Media: Submit record copy of marked-up Shop Drawings and Product Data on CD-R in .PDF format. Bookmark based on the project manual table of contents, and for each Shop Drawings and Product Data within each section. Where Record Shop Drawings and Product Data is required as part of operation and maintenance manuals, submit electronic media of marked-up Shop Drawings and Product Data as part of manual instead of submittal as Record Shop Drawings and Product Data.

#### 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Subcontractor Directory: Name, address and telephone number for all major subcontractors, organized by specification section. Provide a separate list in alphabetical order.
- C. Test Reports: Provide copy of all project test reports. Bind reports in heavy duty D-ring, vinyl covered, loose leaf binders, thickness as necessary to accommodate contents but not greater than 2 inches, and sized to receive 8-1/2-by-11-inch paper. Provide heavy paper dividers with plastic covered tabs labeled for each specification section. Identify each binder on the front and spine with the typed title "Test Reports" and the project name.
  1. Electronic Media: Submit record copy of Test Reports on CD-R in .PDF format. Bookmark based on the project manual table of contents.



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PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839



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SECTION 017900 - DEMONSTRATION AND TRAINING

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 instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Sections include the following:
  - 1. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
  - 2. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

- A. Demonstration and Training: Submit list of systems and equipment to be demonstrated and training provided. Submit training and orientation agenda for each section.
- B. At completion of training, submit one complete training/instruction/operation manual(s) for Owner's use.
- C. Attendance Record: For each training session, submit list of participants and person(s) providing training.

1.4 QUALITY ASSURANCE

- A. Demonstrator and Trainer Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate providing notification of dates, times, length of instruction time, and training content.

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- C. Coordinate content of training with content of approved operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Provide demonstration and training for each system and equipment not part of a system, as required by individual Specification Sections, and applicable items as follows:
1. Fire-protection systems, including fire alarm, sprinkler and fire-extinguishing systems.
  2. Intrusion detection systems.
  3. HVAC systems, including instrumentation and controls.
  4. Electrical service and distribution, including switchboards, and panelboards.
  5. Lighting equipment and controls.
  6. Communication systems and equipment, including telephone and communication systems, data system, security system.
  7. Access control system.
- B. Demonstration and Training: Include instruction as applicable for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Operations and maintenance manuals.
    - b. Project Record Documents.
    - c. Warranties and bonds.
    - d. Maintenance service agreements and similar continuing commitments.
    - e. Applicable video presentations.
  3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  4. Operations: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Startup procedures.
    - c. Equipment or system break-in procedures.
    - d. Routine and normal operating instructions.
    - e. Regulation and control procedures.
    - f. Control sequences.

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- g. Safety procedures.
  - h. Instructions on stopping.
  - i. Normal and emergency shutdown instructions.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Assemble materials necessary for instruction.

#### 3.2 DEMONSTRATION AND TRAINING INSTRUCTION

- A. Engage qualified personnel to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide demonstration and training instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least 15 days' advance notice.

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Sample

Sample (*Modify objectives and agenda subjects for systems and equipment being covered*)

TRAINING AND ORIENTATION AGENDA

Project: \_\_\_\_\_

Date: \_\_\_\_\_

**Equipment / System:** \_\_\_\_\_ **Spec Section:** \_\_\_\_\_

Section 1. Audience and General Scope

Intended audience type (enter number of staff): \_\_\_ facility manager, \_\_\_ facility engineer, \_\_\_ facility technician, \_\_\_ project manager, \_\_\_ tenant, \_\_\_ other: \_\_\_\_\_

**General objectives and scope of training:** (check all that apply)

\_\_\_ A. Provide an overview of the purpose and operation of this equipment, including required interactions of trainees with the equipment.

\_\_\_ B. Provide technical information regarding the purpose, operation and maintenance of this equipment at an intermediate level, expecting that serious malfunctions will be addressed by factory reps.

\_\_\_ C. Provide technical information regarding the purpose, operation, troubleshooting and maintenance of this equipment at a very detailed level, expecting that almost all operation, service and repair will be provided by the trainees.

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Section 2. Instructors

<u>ID</u>	<u>Trainer</u>	<u>Company</u>	<u>Position / Qualifications</u>
1)	_____	_____	_____
2)	_____	_____	_____

END OF SECTION 017900





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SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION AND ALTERATIONS

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. Demolition and removal of selected portions of a building.
  2. Disconnecting, capping or sealing, and abandoning utilities.
  3. Demolition and removal of selected site elements.
  4. Repair procedures for selective demolition operations.
  5. Temporary dust and sound partitions.
  6. Temporary ventilation.
  7. Repair procedures for selective demolition operations.
  8. Patching and repairs.
  9. Coordination with Owner for renovations adjacent to existing occupied spaces.
- B. Related Sections include the following:
1. Division 01 Section "Cutting and Patching" for additional cutting and patching procedures testing operations.
  2. Division 01 Section "Project Record Documents" for documentation of capped utilities and other subsurface structural, electrical or mechanical conditions.
  3. Divisions 21, 22 and 23 Sections for additional requirements regarding demolishing, cutting, patching, or relocating mechanical items.
  4. Division 26 Sections for additional requirements regarding demolishing, cutting, patching, or relocating electrical items.

1.3 DEFINITIONS

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

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1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- B. Carefully remove items indicated to be salvaged in a manner to prevent damage and deliver promptly to the Owner.
- C. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.5 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- D. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's adjacent on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
  - 5. Locations of proposed dust- and noise-control temporary partitions and means of egress. Indicate the proposed time frame for their operation.
  - 6. Coordination of Owner's continuing occupancy of portions of existing building.
  - 7. Locations of temporary partitions and means of egress.
  - 8. Coordination of removals with the installation of new materials to prevent unauthorized entry into the building, and for protection of existing materials and finishes to remain from damage from the weather.
- E. Inventory of items to be removed and salvaged.
- F. Inventory of items to be removed by Owner.
- G. Record Drawings at Project closeout according to Division 01 Section "Project Record Documents."

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1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. 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.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
  1. Inspect and discuss condition of construction to be selectively demolished.
  2. Review structural load limitations of existing structure.
  3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review requirements to keep existing construction in place to minimize disruption of Owner's operations.
  5. Review shoring sequencing for maintaining existing structure without damage during removal of existing structural components.
  6. Review methods of protecting remaining surfaces in weathertight conditions without damage during selective demolition operations and ensuing time frame until exterior envelope can be made permanently weathertight.
  7. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
  9. Provide 5 business days minimum advance notice to participants prior to convening predemolition conference.

1.7 PROJECT CONDITIONS

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct selective demolition so that Owner's operations will not be disrupted. Provide not less than 72 hours' to Owner of activities that will affect Owner's operations.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished.

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1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - C. Storage or sale of removed items or materials on-site will not be permitted.
  - D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
    1. Maintain fire-protection facilities in service during selective demolition operations.
- 1.8 SCHEDULING
- A. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.
- 1.9 WARRANTY
- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
  1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Architect.

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- E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
  - 1. Engineer shall develop shoring and underpinning plans and procedures for removal of structural components indicated to be removed.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

### 3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
  - 1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner or authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
    - a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
  - 1. Arrange to shut off utilities with the Owner.
  - 2. Where utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
  - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
  - 4. Existing piping, conduit, and panels to remain that are supported by walls and ceilings to be demolished, shall be temporarily re-supported to the existing structure until permanent construction is in place.
- C. Utility Requirements: Refer to Divisions 21, 22, 23 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, driveways, walks, walkways, or other adjacent occupied or used facilities outside limits of Work without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by Owner or governing regulations.
  - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
  - 3. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

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- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  4. Flooring Protection:
    - a. At existing buildings where existing flooring is to remain, cover flooring with protection board that will prevent damage from construction activities, including moving of equipment and lifts, metal cuttings from steel cutting and threading operations, oils and fluids that could discolor flooring, water, construction worker traffic and activities.
  5. Cover and protect furniture, furnishings, and equipment that have not been removed.
  6. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, unauthorized entry, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- D. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures and provide exhaust ventilation to limit dust and dirt migration and to separate areas from fumes and noise. Coordinate requirements and locations with the Architect and Owner.
1. All temporary construction partitions shall be extended from the floor through the suspended ceiling, to the underside of floor or roof deck above.
  2. Construct temporary dust partitions from metal studs with 1/2-inch thick fire-retardant plywood on one side and painted 5/8-inch thick gypsum wallboard on the occupied side. Seal all gaps and around perimeter with duct tape. Temporary doors for partitions shall be 3'-0" x 6'-8" doors with standard mortise hardware, closers, weather stripping and keyed locksets to match Owner's. Insulate partition to provide noise protection to occupied areas. Hang vinyl around area while stud and plywood temporary partition is being constructed.
  3. All temporary dust partitions in place less than 1 day may be Cirvico fire-retardant vinyl and adequately supported sealed with duct tape.
  4. Provide walk-off mats both inside and outside construction area at doors entering Owner occupied areas.
  5. Insulate and weatherproof temporary partitions and doors exposed to exterior and exposed to unheated spaces.
  6. All temporary partitions shall remain in place until all cleaning within the work areas has been completed.

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- E. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- F. Core Drilling and Saw Cutting: All penetrations shall be fully planned and coordinated by the Contractor. Vacuum up water created by cutting operations to prevent damage to materials to remain.
- G. Enclose openings to the exterior and to unconditioned spaces to prevent heat loss and maintain temperature at an acceptable level for Owner.
- H. Salvaged Items: Comply with the following:
  - 1. Remove items to be salvaged carefully to prevent damage. Parts and pieces shall be placed in containers and labeled.
  - 2. Clean salvaged items of dirt and demolition debris.
  - 3. Store items in a secure area until delivery to Owner's designated recipient.
  - 4. Transport items to storage area located where directed by the Owner.
  - 5. Protect items from damage during transport and storage.

### 3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
  - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
  - 2. All air-handling ducts shall be shut down or covered whenever possible during demolition activities. This covering or shut down of air-handling ducts shall be approved by the Owner prior to modifying existing conditions.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

### 3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

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2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during and after flame-cutting operations, until risk of fire has past.
  5. Maintain adequate ventilation when using cutting torches.
  6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  7. Break up and remove concrete slabs on grade and foundations where indicated.
  8. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
  9. Remove and replace or reinstall existing construction as necessary to permit installation and alteration of mechanical and electrical work. Coordinate all removals with appropriate trades.
  10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Existing Facilities: Comply with Owner's requirements for using and protecting stairs, walkways, building entries, and other building facilities during selective demolition operations.
1. Comply with requirements of authorities having jurisdiction regarding protection of means of egress.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- E. Roofing: Remove no more existing roofing than can be covered in one day by new roofing or be protected by temporary coverings.
- 3.6 BRACING
- A. Locate bracing to clear columns, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
  - B. Do not place bracing where it will be cast into or included in permanent work, except as otherwise acceptable to Architect.
  - C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.



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- D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand pressures.

### 3.7 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Work Exposed to View: Do not cut or patch in a manner that would, in the Architect's opinion, result in a lessening of the building's aesthetic qualities. Generally, cut from exposed side into concealed spaces to avoid unnecessary damage to finish. Do not cut and patch in a manner that would result in substantial visual evidence of cut and patch work. Restore exposed finishes of patched areas in a manner, which eliminates evidence of patching and refinishing. For continuous surfaces, extend refinish to nearest intersection, with a neat transition to adjacent surfaces.
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - 3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 1. Where suspended acoustical tile ceilings to remain require removal for mechanical or electrical work, remove and re-install upon completion of mechanical and electrical work. Carefully remove acoustical tile and suspension system to prevent damage to components. Save, package and ceiling system components; identify areas where systems removed for re-installation. Protect ceiling tiles to prevent damage to edges. Replace ceiling tile damaged or made dirty.
  - 2. Where existing ceilings are scheduled to be completely removed, remove tile, grid, wall angle and hangers complete.

### 3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Demolished materials shall be recycled to the maximum extent possible.

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1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
2. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.9 CLEANING

A. Sweep the building broom clean on completion of selective demolition operation.

B. Change filters on unprotected air-handling equipment exposed to demolition operations on completion of selective demolition operation.

END OF SECTION 024119

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SECTION 035400 - CEMENT-BASED UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
  - 1. Cement-based, polymer-modified, self-leveling underlayment for interior finish flooring.
- B. Related Sections include the following:
  - 1. Division 09 Sections for patching and leveling compounds applied with finish flooring.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Plans indicating substrates, locations, and average depths of cement-based underlayment based on survey of substrate conditions.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer (applicator) who is acceptable to manufacturer, who has completed cement-based underlayment applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written recommendations for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
- B. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

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1.6 COORDINATION

- A. Coordinate cement-based underlayment with requirements of finish flooring products, including adhesives, specified in Division 09 Sections.
  - 1. Before installing surface sealers recommended by underlayment manufacturer, if any, verify compatibility with finish flooring installation adhesives.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. K-15 Self-Leveling Underlayment Concrete; Ardex, Inc.
  - 2. Levelayer I; Dayton Superior Corp.
  - 3. Thoro Underlayment, Self-Leveling; Harris Specialty Chemicals, Inc.
  - 4. Levelex Underlayment; L&M Construction Chemicals, Inc.
  - 5. Level-Right; Maxxon Corporation.

2.2 PRODUCTS AND MATERIALS

- A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in uniform thicknesses from 1/4 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
  - 2. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
  - 3. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch, or coarse sand as recommended by underlayment manufacturer.
  - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F.
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of underlayment including substrate moisture content. Begin underlayment application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions for substrate indicated. Provide clean, dry, neutral-pH substrate for underlayment application.
  - 1. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment according to manufacturer's written recommendations.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.
- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
  - 1. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
  - 2. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
  - 1. Apply a final layer without aggregate if required to produce smooth surface.
  - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install finish flooring over underlayment until after time period recommended by underlayment manufacturer.
- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

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3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

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SECTION 054000 - COLD-FORMED METAL FRAMING

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. Exterior curtain-wall framing.
  2. Flat strap blocking at openings and trim.
  3. Roof rafter framing.
  4. Exterior plywood sheathing.
  5. Insulation of inaccessible framing voids.
- B. Related Sections include the following:
1. Division 07 Section "Building Insulation" for rigid insulation at exterior masonry walls.
  2. Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation" for spray-applied foam insulation applied in designated locations.
  3. Division 07 Section "Modified Bituminous Sheet Air Barrier" for membrane on sheathing.
  4. Division 09 Section "Gypsum Board Assemblies" for interior non-load-bearing metal-stud framing, shaft wall assemblies, and ceiling-suspension assemblies.

1.3 DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Structural Drawings.
  2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Curtain-Wall Framing: Horizontal deflection of 1/360 of the wall height. Design shall be based upon stud properties only.
    - b. Roof Rafter Framing: Horizontal deflection of 1/240 of the horizontally projected span.

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3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
  4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
    - a. Upward and downward movement of 3/4-inch for floor framing and floor assemblies and 1 inch for roof framing and roof assemblies.
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
  2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

#### 1.5 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures." A complete submittal shall be provided and shall include erection and piece drawings. Shop drawings will not be reviewed as partial submittals. Incomplete submittals will not be reviewed.
- B. Product Data: For each type of cold-formed metal framing product and accessory indicated. Include manufacturer's specifications, finish and installation instructions.
- C. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication, spacing and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.
1. Design Data: For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
    - a. Gages indicated are minimum allowable uncoated gage. Verify load capacity of manufacturer's product being furnished for Project.
  2. Sizes, gages and fastenings for all built-up members including but not limited to headers and jambs.
  3. Type, size, quantity, locations and spacings of anchorages and self drilling screws.
  4. Details of attachment to structure and adjacent work.
  5. Supplemental strapping, bracing, splices, bridging, hat channels and other accessories required for proper installation.
  6. Locations and layouts for flat strap blocking locations to attach siding and trim including, door, window and lover opening, roof rakes, accent trim locations, and miscellaneous conditions and terminations. Meet with Contractor, and window, siding and trim installers to coordinate locations and requirements.
  7. Critical installation procedures.



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- D. Design Data for Information: For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Gages indicated are minimum allowable uncoated gage. Verify load capacity of manufacturer's product being furnished for Project.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
  - 1. Expansion anchors.
  - 2. Power-actuated anchors.
  - 3. Mechanical fasteners.
  - 4. Vertical deflection clips.
  - 5. Miscellaneous structural clips and accessories.
- G. Research/Evaluation Reports: Evidence of cold-formed metal framing's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- H. Welding Certificates: If welding is included in framing design, submit copies of certificates for welding procedures and personnel.
- I. Installation of Cold-Formed Metal Framing Report: Submit copy of engineer's report of completed framing installation that is ready to receive gypsum sheathing.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.
  - 1. Design exterior steel stud wall systems including all necessary stiffeners and bracing connections and anchorage required for a complete structural system. Design shall include verification of framing design such that pull out loads under wind or seismic loads will not be exceeded for sheathing and cladding material attachment.
    - a. Design Wind Pressures: Design wind pressures calculated in accordance with ASCE 7-02 for Components and Cladding, shall be used in the design of the exterior cold-formed steel framing system. Design shall be based upon stud properties only. Utilize wind speed, importance factor and exposure indicated in Structural Drawing General Notes.
    - b. Slip Track Tolerances: Where non-bearing cold-formed steel framing abuts the structure, provide a slip joint capable of accommodating the upward and downward vertical movement of the structure. Slip joint gaps shall allow for 1-

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inch live load deflection of the supporting member at perimeter roof supporting structural steel frame.

2. Professional Engineer responsible for design of cold-formed framing shall review the installation and submit a correspondence indicating compliance with the design. Review shall include all work. Discrepancies noted shall be corrected and reviewed by the Engineer prior to the submittal of the correspondence.
  - C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
  - D. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
    1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
  - E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
    1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
    2. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."
  - F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - G. Inspection of Cold-Formed Metal Framing: Prior to applying gypsum sheathing, engineer responsible for the design of framing shall inspect framing installation for compliance.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
  - B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.
- 1.8 COORDINATION
- A. Coordinate installation of cold-formed metal framing with application of spray-applied foam insulation applied in designated locations.
  - B. Coordinate with Contractor, and window, siding and trim installers for flat strap blocking requirements.

PART 2 - PRODUCTS

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2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cold-Formed Metal Framing:
    - a. Clark Western Building Systems, Inc.
    - b. Dietrich Metal Framing; a Worthington Industries Company.
    - c. MarinoWare; Div. of Ware Industries, Inc.
  2. Glass-Mat Gypsum Sheathing Board:
    - a. Dens-Glass Gold; Georgia-Pacific Corporation.
    - b. GlasRoc Sheathing; CertainTeed Corporation.
    - c. Expended Exposure Sheathing e<sup>2</sup>xp; National Gypsum Company.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, of grade and coating weight as follows:
1. Grade: As required by structural performance.
  2. Coating: G60.

2.3 CURTAIN-WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:
1. Minimum Uncoated-Steel Thickness: Not less than 0.0329 inch, 20 gage, including cripple studs, short stud infill, and structural steel infill.
  2. Flange Width: 1-5/8 inches.
  3. Sizes: As indicated on Drawings. Increase gage if higher structural properties are required.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955, and as follows:
1. Minimum Uncoated-Steel Thickness: Not less than steel studs in material, gage, and finish.
  2. Flange Width: Not less than 1-1/4 inches.
- C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads, and as follows:
1. Minimum Uncoated-Steel Thickness: Not less than steel studs in material, gage, and finish; gage as required to resist loading indicated.
  2. Flange Width: Not less than 2 inches to allow for 3/4-inch deflection at floor levels and not less than 3 inches to allow for 1 inches of deflection at roof levels.
- D. Bridging:
1. Minimum Uncoated-Steel Thickness: Not less than steel studs in material, gage, and finish.
  2. Shape: Cold-formed channel section.
  3. Size: 1-1/2 inches web depth.

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- E. Deflection Brackets:
  - 1. Product: VertiClip; Signature Industries; (919) 844-0789.
  - 2. Construction: Slotted galvanized steel angle with step bushing to prevent over tightening of fasteners.
  - 3. Vertical Deflection: Capable of 1-1/2 inches total travel at floor levels and 3-inches total travel at roof levels.
  - 4. Series: SL, SDL, SLB, AND SLS as required by attachment condition.

#### 2.4 ROOF-RAFTER FRAMING

- A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, complying with ASTM C 955, and as follows:
  - 1. Minimum Uncoated-Steel Thickness: 0.0677 inch (14 ga.).
  - 2. Flange Width: 2 inches, minimum.

#### 2.5 FRAMING ACCESSORIES

- A. Miscellaneous Framing Components: Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members, with a minimum yield strength of 33,000 psi.
- B. Flat Strap Blocking: Fabricate from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
  - 1. Width: 8 inches.

#### 2.6 ANCHORS, CLIPS, AND FASTENERS

- A. General: Provide required or indicated items; provide galvanized fasteners for assemblies having galvanized major steel components.
- B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- D. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

#### 2.7 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.
- B. Fiberglass Insulation. Fiberglass insulation installed in enclosed locations that are inaccessible after assembly of metal framing shall comply with requirements of Division 07 Section "Building Insulation."

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- C. Spray Closed Cell Foam Insulation: Foam insulation indicated to be installed in locations indicated shall comply with requirements of Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation."

2.8 EXTERIOR SHEATHING

- A. Plywood Sheathing: Refer to Section 061000 – Rough Carpentry for plywood wall sheathing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- B. Install cold-formed metal framing and accessories plumb, square, and true to line, with lateral bracing and bridging, and with connections securely fastened, according to referenced standards, manufacturer's written recommendations and requirements in this Section.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads. Use minimum of two self-tapping metal screws per connection, unless otherwise indicated.
- C. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members. Splicing of load bearing components and curtain wall studs is prohibited.
- D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

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- F. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location and a maximum of 2 inches from abutting walls. Construct corners using minimum of three studs. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Align top and bottom tracks; locate as indicated, and secure track to substrates at spacing required on engineered Shop Drawings, but not more than 16 inches on center, using fastening methods specified in manufacturer's printed installation instructions for Project substrate types.
  3. Install double studs at jambs of openings for doors, cased openings, and windows; install intermediate studs above and below openings to align with wall stud spacing.
  4. Seat studs in track, square with track flange, with stud end maximum 1/16 inch from surface of track web.
  5. Attach cross studs for attachment of fixtures; install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
  6. Provide web stiffeners at locations indicated or required.
- G. Insulate voids in exterior framing with fiberglass insulation that will be inaccessible after erection of framing. Coordinate locations including framing cavity locations indicated to receive spray-foam insulation.

### 3.3 CURTAIN-WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to bottom track only, unless otherwise indicated. Do not fasten studs to deep-leg deflection tracks. Space studs as follows:
1. Stud Spacing: 16 inches, unless otherwise indicated .
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single deep-leg deflection tracks and anchor to building structure.
- E. Install horizontal bridging in curtain-wall studs, spaced in rows indicated on Shop Drawings but not more than 54 inches apart. Fasten at each stud intersection.
1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

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- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtain-wall-framing system.
- G. Install an additional framing member 8 inches either side of door and window jambs as required to provide continuous support and attachment of flat strap blocking; apply flat strap blocking to framing members around perimeter of rough openings for windows, doors, along gable rakes, horizontal trim and similar conditions and terminations to facilitate fastening requirements of siding and trim installation to meet 100 mph wind load design with 36 psf positive and negative wind pressure per code.

### 3.4 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
  - 1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
  - 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- C. Space joists not more than 2 inches from abutting walls, and as follows:
  - 1. Joist Spacing: As indicated.
- D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated on Shop Drawings.
  - 1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at each end of joists and at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
  - 1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

### 3.5 FIELD QUALITY CONTROL

- A. Testing: Engineer responsible for designing cold-formed metal framing shall perform field quality-control testing.

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1. Professional Engineer responsible for design of cold-formed framing shall review the installation and submit a correspondence indicating compliance with the design. Review shall include all work. Discrepancies noted shall be corrected and reviewed by the Engineer prior to the submittal of the correspondence.
- B. Field and shop welds will be subject to inspection and testing.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace Work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing and sheathing are without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000



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SECTION 055000 - METAL FABRICATIONS

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. Steel framing and supports for mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Miscellaneous fabrications:
    - a. Closure sheet for louvers.
  - 4. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- B. Products furnished, but not installed, under this Section:
  - 1. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
- C. Related Sections:
  - 1. Division 05 Section "Structural Steel."
  - 2. Division 06 Section "Architectural Woodwork" for manufactured countertop supports.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittals Procedures."
- B. Product Data: For the following:
  - 1. Paint products.
  - 2. Grout.
- C. Shop Drawings: Show fabrication and installation details for metal fabrications.
  - 1. Provide templates for anchors and bolts specified for installation under other Sections.
- D. Welding certificates: Signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" Article.

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 Work.

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- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
  - 3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

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

1.6 COORDINATION

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

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Brackets, Flanges, and Anchors: Formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless another weight is indicated or required by structural loads.
  - 1. Provide galvanized finish for exterior installations and where indicated.
  - 2. Black finish, unless otherwise indicated.

2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

2.4 FASTENERS

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

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1. Provide stainless-steel fasteners for fastening aluminum.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3.
- G. Lag Screws: ASME B18.2.1.
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1.
- J. Lock Washers: Helical, spring type, ASME B18.21.1.
- K. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.
- L. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- M. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- N. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- O. Chemical Anchors: Two-part epoxy systems with impacted bolt, rod or anchor as follows:
  1. Concrete Anchor: Epoxy capsule system similar to Hilti HVA Adhesive Anchor System, Ramset Chemset anchor system, or approved equal.

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2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint system indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dayton Superior Corporation; Sure-Rrip High Performance Grout
    - b. Euclid Chemical Company; NS Grout.
    - c. Five Star Products; Five Star Grout.
    - d. L & M Construction Chemicals, Inc.; Crystex.
    - e. Master Builders Technologies, Inc.; Masterflow 928.
    - f. W. R. Meadows, Inc.; Sealtight 588 Grout.
    - g. Sonneborn Building Products - ChemRex, Inc.; SonogROUT 14.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

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- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
  - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Furnish inserts for units installed after concrete is placed.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete construction.
- C. Closure sheet for louver: Cut sheet to required size.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Prime plates with primer.

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2.10 ROUGH HARDWARE

- A. 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 6 Sections.
- B. 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.

2.11 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.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.12 STEEL AND IRON FINISHES

- A. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete or masonry, or unless otherwise indicated.
  - 1. Shop prime with universal shop primer, unless indicated otherwise.
- B. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
  - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Interior Items: SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.13 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and

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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.

### 3.2 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed 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 surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

### 3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

### 3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END OF SECTION 055000





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SECTION 061000 - ROUGH CARPENTRY

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. Wall sheathing.
  - 2. Roof sheathing.
  - 3. Subflooring.
  - 4. Underlayment.
  - 5. Wood blocking and nailers.
  - 6. Plywood backing panels.
  - 7. Blocking for toilet accessories, including Owner furnished toilet accessories.
  - 8. Blocking for Owner furnished items.
- B. Related Requirements:
  - 1. Division 07 Section "Building Insulation" for rigid insulation and z-furring supporting plywood wall sheathing.
  - 2. Division 07 Section "Modified Bituminous Sheet Air Barriers" for water-resistive barrier at exterior walls.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 2. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516 and ASTM D 5664.

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3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Fire-retardant-treated plywood.
4. Power-driven fasteners.
5. Powder-actuated fasteners.
6. Expansion anchors.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer for both treatment and fire-retardant formulation.
- B. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.
- B. Stack lumber and panels flat with spacers beneath and between each bundle to provide air circulation. Protect lumber and panels from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
  1. For lumber pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS FOR SHEATHING

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

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2.2 WOOD AND PANEL PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.
- C. Plywood: DOC PS 1.
- D. Thickness for Panel Products: As needed to comply with requirements specified, but not less than thickness indicated.
- E. Factory mark panels to indicate compliance with applicable standard.

2.3 WOOD-PRESERVATIVE-TREATED LUMBER AND PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - 2. Preservative Chemicals: Copper Azole, CBA-A or CA-B, Wolmanized Natural Select.
  - 3. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
  - 4. Preservative Chemicals: Micronized Copper Azole, MCA.
    - a. Product: MicroPro/Life Wood; Osiose, Inc.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber . Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- E. Application: Treat items indicated on Drawings.

2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-

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test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity.
  - 4. Design Value Adjustment Factors for Lumber: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
  - 5. Design Value Adjustment Factors for Plywood: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or that does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated wood and plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
  - 1. Concealed framing and blocking, both lumber and plywood.
  - 2. Roof and wall sheathing, except as indicated otherwise.
  - 3. Subflooring and underlayment.
  - 4. Plywood backing panels.

## 2.5 DIMENSION LUMBER FRAMING

- A. Studs, Rafters and Miscellaneous Framing: Construction or No. 2 or better.
  - 1. Maximum Moisture Content: 19 percent.
  - 2. Species: Spruce-pine-fir; NLGA or NeLMA.

## 2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.

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- B. For items of dimension lumber size, provide No. 2 or better lumber for miscellaneous construction. Standard, Stud, or No. 3 grade lumber for blocking.
  - 1. Species: Spruce-pine-fir; NeLMA or NLGA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
  - 1. Spruce-pine-fir; Standard or No. 3 Common grade; NeLMA, or NLGA.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. Miscellaneous lumber shall be fire-retardant-treated.

## 2.7 WALL SHEATHING

- A. Plywood Wall Sheathing: APA graded, Exposure 1 sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 1/2 inch.
  - 3. Species: Fir.
  - 4. Shall be fire-retardant-treated.

## 2.8 ROOF SHEATHING

- A. Plywood Roof Sheathing: APA graded, Exposure 1 sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 5/8 inch.
  - 3. Species: Fir.
  - 4. Shall be fire-retardant-treated.

## 2.9 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring: Exposure 1, Structural I single-floor panels or sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 23/32 inch.
  - 3. Species: Fir.
  - 4. Shall be fire-retardant-treated.
- B. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.
- C. Plywood Underlayment for Resilient Flooring: DOC PS 1, 3-ply Canadian poplar plywood with fully sanded face.
  - 1. Nominal Thickness: 3/8 inch.
  - 2. Product: Multiply Underlayment by Multiply Plywood.

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2.10 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.11 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  - 2. Where pressure-preservative treated lumber or panels are used, provide Type 304 stainless steel fasteners.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
  - 1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.12 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Framing to Concrete: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and framing.

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PART 3 - EXECUTION

3.1 FRAMING INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- C. Provide blocking as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- D. Provide fire-retardant-treated blocking in furred spaces, stud spaces, and other concealed cavities as indicated.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
  - 3. Published requirements of metal framing anchor manufacturer.
  - 4. Provide construction adhesive for adhering bottom plates to concrete floor at radiant heated slabs.
- G. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
  - 1. Use hot-dip galvanized or stainless steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.
  - 2. Use stainless steel fasteners for fastening pressure preservative treated materials.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Install wood blocking, and nailers to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, casework, furnishings, window treatment, handrail brackets, shelving, residential casework, building specialties, clothes rods, wire shelving, window sills, drywall window return shims, countertop supports, resident room mailboxes, Owner furnished items, metal flashing, siding and trim support, roof blocking, base flashing backer, and equipment supports, or similar construction. Provide 3/4-inch thick plywood covering a minimum of 32 inches square for toilet

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accessories. Provide 1-1/2 inch thick solid blocking minimum, for exterior wall mounted solid vinyl brie de soliel, grab bars, and handrail supports. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

1. Install blocking for grab bars, and handrail supports to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.
  2. Provide concealed wood blocking behind gypsum wallboard where door stops are to be installed.
  3. Provide fire retardant treated wood and plywood.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated. Where possible, secure anchor bolts to formwork before concrete placement.
- C. Roofing Nailers: Install wood nailers of same total thickness as insulation. Anchor perimeter nailers to substrate in a manner to resist a force of 75 pounds per linear foot in any direction. Top nailer shall be fastened through the lower layers and into metal deck.

### 3.3 MISCELLANEOUS FRAMING INSTALLATION

- A. Install framing members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit.

### 3.4 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with structural drawings and applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
1. Subflooring:
    - a. Glue and nail to wood framing. Apply continuous adhesive bead in groove to receive panel tongue. Apply continuous adhesive beads to all structural framing members complying with sheathing manufacturer's requirements. Nailing pattern per structural drawing requirements. Remove excess adhesive squeeze out from panel face at joints.
    - b. Space panels 1/8 inch apart at edges and ends.
  2. Wall and Roof Sheathing:
    - a. Nail to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.
  3. Underlayment:
    - a. Nail to subflooring with ring shank nails.
    - b. Space panels 1/32 inch apart at edges and ends.
    - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.



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4. Plywood Backing Panels: Screw to supports.

END OF SECTION 061000



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SECTION 06200 - FINISH CARPENTRY

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. Exterior standing and running trim and associated flashing.
  - 2. Bracketed PVC brie de soleil and roof brackets.
  - 3. Interior standing and running trim for field-painted finish.
  - 4. Ornamental fiberglass columns.
  - 5. Reinforced fiberglass wall protection systems.
- B. Related Sections include the following:
  - 1. Division 06 Section "Architectural Woodwork" for custom interior wood standing and running trim, shop-fabricated custom casework, wood handrails, and interior woodwork.
  - 2. Division 07 Section "Vinyl Siding" for vinyl siding, soffits, and exterior vinyl ceilings.
  - 3. Division 09 Section "Painting" for priming, backpriming, and finishing of finish carpentry.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of process and factory-fabricated product. Include construction details, material descriptions, dimensions of individual components and profiles, textures, and colors.
- C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for corner guards.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Maintenance Data: For finishes to include in the operation and maintenance manual specified in Division 01. Include cleaning methods, cleaning solutions recommended, and stain removal methods recommended. Also include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
- F. Warranties: Special warranties specified in this Section.

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1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed finish carpentry similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for PVC Trim: Obtain all PVC trim through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Where fire-retardant materials are indicated, provide materials with specified fire-test-response characteristics as determined by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency on surfaces of materials that will be concealed from view after installation. Materials shall meet the following requirements when tested in accordance with ASTM E 84:
  - 1. Flame Spread: 25 or less.
  - 2. Smoke Developed: 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover, off ground, and dry. Protect materials against weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings.
- B. Fiberglass Reinforced Wall Protection: Store materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and out of direct sunlight.
- C. Deliver interior finish carpentry only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.6 PROJECT CONDITIONS

- A. Weather Limitations for Exterior Finish Carpentry: Proceed with installation only when existing and forecasted weather conditions permit work to be performed according to manufacturer's written instructions and warranty requirements and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.
- B. Environmental Limitations for Interior Finish Carpentry: Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and provisions are made to maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
  - 1. Fiberglass Reinforced Wall Protection Systems: Do not install until the ambient temperature within the building is maintained at not less than 70 deg F for not less than 72 hours before, during and after installation.

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1.7 WARRANTY

- A. General: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Warranty for Cellular PVC Trim: Manufacturer agrees to repair or replace trim that fails due to defects in manufacturing within specified warranty period. Failures include, but are not limited to, deterioration, delamination, and excessive swelling from moisture.
  - 1. Warranty Period: Manufacturer's standard, but not less than 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufactures specified.
  - 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 EXTERIOR STANDING AND RUNNING TRIM

- A. Cellular PVC Materials, General: ASTM D 3679, extruded, expanded PVC with a small-cell microstructure, made from UV- and heat-stabilized, rigid material.
  - 1. Density: ASTM D 792, 0.55 g/cu. cm.
  - 2. Heat Deflection Temperature: Not less than 135 deg F, per ASTM D 648.
  - 3. Coefficient of Thermal Expansion: Not more than  $3.2 \times 10^{-5}$  inches/inch x deg F.
  - 4. Water Absorption: Not more than 1 percent, per ASTM D 570.
  - 5. Flame-Spread Index: 20 or less, per ASTM E 84.
- B. Cellular PVC Trim and Accessories: Smooth PVC trim shall be milled to indicated shape and size.
  - 1. Products:
    - a. Kler Lumber, LLC; Kler Trimboard.
    - b. Vycom Corp.; Azek.
    - c. Wolfpac Technologies, Inc.; Versatex.
  - 2. Trim and Accessories: PVC trim and moldings shall be milled to indicated shape and size. Trim where siding butts shall be 5/4 thickness.
- C. Concealed Fasteners for Cellular PVC Trim: Concealed fastening system using screws that create a cored-out hole for trim plug and matching plugs for PVC trim.
  - 1. Coordinate that type of trim plug matches manufacturer of PVC products.
  - 2. Product: FastenMaster; Cortex Concealed Fastening System - PVC Trim; phone: (800) 518-3569.

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- D. Adhesive for PVC Trim Boards: Bond & Fill, Advances TrimWorks, Inc., 877-822-7745.
- E. Installation Adhesive (Bonding PVC to Wood Substrate): OSI TRIMTeQ TEQ Mounting Adhesive.
- F. Cap Flashing for Exterior Trim: Horizontal joint flashing for panels and trim. Preformed aluminum Z-shaped flashing, minimum 0.032-inch thick, with factory applied polyester prime paint finish. Provide one shop coat of finish to match siding before installation of flashing. Installed flashing specified to be field painted with second coat of finish under Division 09 Section "Painting."
  - 1. Fabricate for waterproof and weather-resistant performance, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Form shapes with metal break equipment, providing minimum of 8-foot lengths. Fabricate flashing to turn up wall 2 inches minimum. Install in full-length pieces without joints for locations less than the maximum available lengths. Seal lap joints with concealed bead of sealant.
- G. Ledge Flashing for Water Table: Fabricate to detail from aluminum, minimum 0.032-inch thick, with factory applied polyester prime paint finish. Provide one shop coat of finish to match siding before installation of flashing. Installed flashing specified to be field painted with second coat of finish under Division 09 Section "Painting."
  - 1. Form work to fit water table cap; ledge flashing shall have a hemmed lower edge and shall turn up wall 2 inches minimum. Form shapes with metal break equipment, providing minimum of 8-foot lengths. Install in full-length pieces without joints for locations less than the maximum available lengths. Seal lap joints with concealed bead of sealant.

## 2.3 EXTERIOR DECORATIVE COMPONENTS

- A. Bracketed PVC Brie de Soliel and Roof Brackets: Fabricate to details using solid PVC components and tubular aluminum horizontal components for Brie de Soliel.
  - 1. Tubular Aluminum Component: Provide tubular aluminum in size indicated and with ends capped flush.
    - a. Finish aluminum with a two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat; color as selected by Architect.
  - 2. Building Attachment: Stainless steel lag bolts, set in countersunk holes with PVC plugs.

## 2.4 STOCK INTERIOR STANDING AND RUNNING TRIM

- A. Rigid Polyurethane Moldings: Rigid polyurethane moldings made by Crown-Molding.com or equal. Fypon is not acceptable as it does not meet the flame rating.
  - 1. Fire Resistance Rating: Class B.
    - a. Flame Spread: Less than 75 when tested in accordance with ASTM-E84.
  - 2. Profiles: As indicated on the drawings.

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2.5 ORNAMENTAL COLUMNS

- A. Ornamental Column Enclosures, Opaque Finish: Factory fabricated from FRP, split column enclosure for installation around structural steel columns.
  - 1. Style: Tapered round Tuscan, unfluted.
  - 2. Size: 10 inch diameter.
  - 3. Product: Turncraft Poly-Classic Columns with base and capital to match existing.

2.6 WALL PROTECTION SYSTEM

- A. Fiberglass Reinforced Wall Panel (FRP): Kemlite Fire-X Glasboard with surfaseal, 0.090 inch thick x 4 feet wide x full height panels. PVC inside and outside corners, and 1-inch wide, minimum, H-molding. Use adhesive and caulking as specified by manufacturer. Color for panel and molding shall match.
  - 1. Color: As selected by Architect from manufacturer's full range of colors.
- B. Adhesive: Comply with paneling manufacturer's recommendations for adhesives.
- C. Sealant: Single-component, mildew-resistant, neutral-curing silicone sealant recommended by plastic paneling manufacturer.
  - 1. VOC Content for Sealant: Sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws of the following materials, in sufficient length to penetrate minimum of 1-1/2 inches into substrate, unless otherwise recommended by manufacturer:
  - 1. Stainless steel.
  - 2. Hot-dip galvanized steel.
  - 3. Noncorroding aluminum.
- B. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours, unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
  - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
  - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
  - 4. Coordinate finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of finish carpentry.
  - 5. Finish according to specified requirements.
  - 6. Refer to Division 09 Section "Painting" for final finishing of finish carpentry.

3.4 STANDING AND RUNNING PVC TRIM INSTALLATION

- A. Install PVC trim and panels in accordance with manufacturer's instructions and recommendations.
- B. Trim: Install with minimum number of joints practical, using full-length pieces from maximum lengths of material available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce uniform joints throughout length of joint. Joints shall be glued with joint bonding adhesive.
  - 1. Long runs of trim that require a joint for expansion shall be ship-lapped and installed with a 3/16-inch gap in ship-lapped joint, allowing for expansion and contraction.
  - 2. Trim around door and window openings shall be glued at joining of horizontal and vertical components.
  - 3. Fit exterior joints to exclude water.
  - 4. Place ripped edges up to be hidden by flashings, or place cut edge against adjacent material to hide to the maximum extent possible.
- C. Fastening Trim: Exterior eave and gable trim with backer shall be glued to the substrate in addition to screw fasteners. Exterior trim shall be installed with concealed fastening system producing hole for trim plug. Do not fasten trim within 3/8-inch of product edge. Holes for fasteners within 1/2-inch of trim shall be predrilled. Prevent over-tightening or overdriving of



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fasteners. Fill holes with plugs cut from same cellular PVC as trim boards. Place PVC trim plug into hole with the trim surface side up and gently tap until it is flush with trim surface.

1. Apply installation bonding adhesive to substrate each side of joints, and in a serpentine pattern along full width and length of trim. Adhesive shall be applied and cured above 40 degrees F.
2. Uniformly and equally space fasteners, maintaining vertical and horizontal alignment of fasteners to produce a neat, uniform appearance. Fasteners shall penetrate into solid wood blocking a minimum of 1-1/4 inches.

D. Installation of Z-Flashing: Provide drip cap flashing over doors, windows and where indicated. Provide full-length pieces without lap splices to the maximum extent possible. For runs requiring splices, set vertical and horizontal legs of lap in sealant.

1. At Steel Framed Walls: Run flashing back to exterior gypsum wall sheathing and turn up 2 inches minimum and flash into air barrier waterproofing.
2. At CMU Walls: Run flashing back to exterior plywood sheathing, turn up sheathing behind weather barrier a minimum of 2 inches, and seal with weather barrier flashing tape.

### 3.5 INSTALLATION OF EXTERIOR DECORATIVE COMPONENTS

A. General: Install in accordance with manufacturer's written instructions. To the maximum extent possible, conceal fasteners countersinking with PVC plugs. Install components level, plumb, and true to line without distortions.

### 3.6 INTERIOR STANDING AND RUNNING TRIM

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
2. Install trim after gypsum board joint finishing operations are completed.

### 3.7 INSTALLATION OF INTERIOR COLUMN ENCLOSURES

A. Install columns to comply with manufacturer's written instructions. Comply with requirements below unless manufacturer's written instructions state otherwise.

B. Lay out column locations on ceiling and plumb down to locate column locations at floor.

C. Set plinths in location, shim as required to temporarily level, and scribe and trim as required so that tops of plinths will sit level without use of shims. Seal cut surfaces with sealer or primer and fasten plinths to floor using pins or fasteners as recommended by manufacturer.

D. Set columns in location, shim as required to temporarily plumb, and scribe and trim as required so that columns will sit plumb without shims.

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- E. Scribe and trim tops of columns to fit to ceiling.
- F. Seal ends of columns with sealer or primer.
- G. Install column caps on columns and fasten to columns.
- H. Secure columns in place at top and bottom with fasteners recommended by manufacturer.

3.8 FRP INSTALLATION

- A. Install according to manufacturer's recommendations. Set fiberglass reinforced panel edges in silicone sealant. Perimeter and H-moldings shall be fastened through the wallboard to studs or blocking back-up. Provide continuous cove base molding at the bottom of fiberglass panels, set in sealant. Apply wall panels with adhesive, allowing proper clearance for expansion and contraction. Brace wall panels to assure even contact to wall until adhesive has cured.

3.9 ADJUSTING

- A. Replace finish carpentry that is damaged or does not comply with requirements. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.10 CLEANING

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

3.11 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 062000

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SECTION 064000 - ARCHITECTURAL WOODWORK

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. Custom interior standing and running trim.
  2. Plastic laminate countertops.
  3. Solid-surfacing-material countertops.
  4. Corridor handrails.
  5. Wood wall caps.
  6. Window sills and aprons.
  7. Bench seat.
  8. Shop finishing of interior woodwork and casework, except standing and running trim.
- B. Related Sections include the following:
1. Division 06 Section "Rough Carpentry" for wood blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
  2. Division 06 Section "Finish Carpentry" for interior stock standing and running trim, interior carpentry exposed to view that is not specified in this Section.
  3. Division 09 Section "Painting" for field finishing of interior standing and running trim and for field finishing of counter brackets.
  4. Division 10 Section "Signage and Graphics" for sign applied to wood mailboxes.
  5. Division 12 Section "Residential Casework" for manufactured stock cabinets and standing and running trim for cabinets, and for postformed countertops.

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
- B. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.
- C. Semiexposed Surfaces of Casework: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Bottoms of wall cabinets are defined as "semiexposed."
- D. Concealed Surfaces of Casework: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly

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against and completely concealed by walls or other cabinets. Tops of wall cabinets and tall cabinets are defined as "concealed."

1.4 ACTION SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated, including handrail brackets, and finishing materials and processes.
  - 1. Adhesives: Manufacturers' product data for shop and installation adhesives, including printed statement of VOC content.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show details full size.
  - 2. Show locations and sizes of blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for grommets installed in architectural woodwork.
- D. Samples for Initial Selection:
  - 1. Shop-applied transparent (stained) finishes.
- E. Samples for Verification:
  - 1. Lumber with or for transparent (stained) finish, not less than 5 inches wide by 24 inches long, for each species and cut, finished on 1 side and 1 edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: An experienced Installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards, Eight Edition" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

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- B. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by accurate field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.9 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: Cherry, plain sawn or sliced, no sap wood for exposed surfaces.
- C. Wood Species for Opaque Finish: Any closed-grain white hardwood.
- D. Wood Products: Comply with the following:
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade MD.
  - 2. Particleboard: ANSI A208.1, Grade M-2.
  - 3. Hardwood Plywood and Face Veneers: HPVA HP-1, Grade A veneers.
    - a. Veneer Core Construction, All Locations Except as Noted: Veneer core plywood, no voids.
      - 1) 3/4-Inch Thickness: 7 plies.
      - 2) 1/2-Inch Thickness: 5 plies.
- E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. E. I. du Pont de Nemours and Company.
  - b. Formica Corporation.
  - c. LG Hausys, Ltd.
2. Type: Standard type, unless Special Purpose type is indicated.
  3. Colors and Patterns: As selected by Architect from manufacturer's full range.

## 2.2 CABINET HARDWARE

- A. Grommets for Cable Passage through Countertops: Molded-plastic grommets and matching plastic caps with slot for wire passage; color and size as selected by Architect during Shop Drawing review.
  1. Manufacturer: Subject to compliance with requirements, provide products from one of the following:
    - a. Doug Mockett and Co., Inc.
    - b. Outwater Plastics, (800) 631-8375.
- B. Table Legs: Smooth steel table legs with durable chrome finish and adjustable foot.
  1. Height: 27-3/4 inch.
  2. Diameter: 2-3/8 inch.
  3. Product: Rome Table & Desk Height Legs available from Table Leg World.
- C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  1. Satin Chromium Plated: BHMA 626 (US26D) for brass or bronze base; BHMA 652 for steel base.
- D. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.3 CABINET ACCESSORY MATERIALS

- A. Counter Bracket Supports: Fabricated of 6063 T-6, T-shaped extruded aluminum; MIG welded along 45 degree miters and along back; pre-punched for 1/4-inch fasteners; provide rubber grommet in 7/8-inch hole; powder coated finish.
  1. Size: Varies as required for condition; coordinate with Drawings.
  2. Mounting Style: Exposed and concealed mounting; coordinate with Drawings.
  3. Product: Rakks, Rangine Corp., Millis, MA.
- B. Brackets for Wood Handrails: Two heavy gage aluminum, adjustable mounting brackets; one for mounting to wall and one for mounting to handrail; sized to provide 1-1/2 inch clearance between handrail and wall.
  1. Product: Rakks Handrail Mounting Bracket HR-303; Rangine Corp., Millis, MA.

## 2.4 MISCELLANEOUS MATERIALS

- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

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2.5 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and any additional requirements of this Section. When quality grade is not indicated, provide Custom quality grade.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
  - 2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
- D. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- E. Shop-cut openings to maximum extent possible to receive grommets. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.6 CUSTOM INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Grade: Custom.
- B. Wood Species and Cut: Cherry, plain sawn or sliced, no sap wood for exposed surfaces.

2.7 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 400 and additional specified requirements for wood cabinets.
- B. Grade: Custom.
- C. Wood Species and Cut for Exposed Surfaces: Cherry, plain sawn or sliced.
  - 1. Matching of Veneer Leaves: Book match.
  - 2. Veneer Matching within Panel Face: Running match.

2.8 PLASTIC-LAMINATE COUNTERTOPS

- A. Grade: Premium.
- B. High-Pressure Decorative Laminate Grade: HGS.

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- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As indicated in Materials Legend by manufacturer's designations.
  - 2. Match Architect's sample.
  - 3. As selected by Architect from manufacturer's full range.
- D. Grain Direction: Parallel to cabinet fronts.
- E. Edge Treatment: As indicated.
- F. Core Material: Particleboard.
- G. Core Material at Sinks: Exterior-grade plywood.
- H. ADA Sink Areas: In countertops with stepped areas for ADA sinks, construct depressed area and vertical sides with plywood substrate. Face edge of tops shall be 1-inch wide minimum, fully covering substrate. No joints shall occur within 2 feet of a sink. Sand surfaces to which plastic laminate is to be bonded.
- I. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, or phenolic laminate on underside of countertop substrate.
- J. Paper Backing: Provide paper backing on underside of countertop substrate.

2.9 SOLID-SURFACING-MATERIAL COUNTERTOPS

- A. Grade: Custom.
- B. Solid-Surfacing-Material Thickness: 1/2 inch unless indicated otherwise.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range.
- D. Fabricate tops in one piece to configurations indicated, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate tops with shop-applied edges of materials and configuration indicated.
  - 2. Fabricate tops with shop-applied backsplashes with scribe strip along top and exposed vertical edgess.
  - 3. Fabricate tops with shop installed under mount integral sink bowls.

2.10 POSTFORMED PLASTIC-LAMINATE COUNTERTOPS

- A. Product: Hartson-Kennedy Cabinet Top Co. Inc., 800-388-8144.
- B. Plastic Laminate for Countertops: As indicated on Materials Legend.
- C. Configuration: Provide countertops with the following front, backsplash, and end-splash style:



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1. Postform with Backsplash: E-Top #1500 kitchen top with 180 degree 1-1/2-inch front nose, 1/4" radius backsplash cove, 3/4-inch radius backsplash top with 3/8- inch scribe strip.
2. End Splash: Where indicated.
3. Countertop with Eased Edge: E-Top #1500 flat deck top with 180 degree 1-1/2-inch front nose,
4. Substrate: Particle Board. Moisture-resistant particle board core and build-down strip for entire top with a sink.

2.11 CORRIDOR HANDRAILS AND WALL CAPS

- A. Quality Standard: Comply with AWI Section 300, Premium Grade.
- B. Corridor Handrails:
  1. Wood Species for Transparent (Stained) Finish: Cherry, plain sawn or sliced, no sap wood for exposed surfaces.
  2. Size and Configuration: As indicated.
- C. Wall Caps:
  1. Wood Species for Transparent (Stained) Finish: Cherry, plain sawn or sliced, no sap wood for exposed surfaces.
  2. Size and Configuration: As indicated.

2.12 WINDOW TRIM

- A. Quality Standard and Grade: Comply with AWI Section 300, Custom Grade.
- B. Window Sills (Stools), Opaque Finish: Any closed-grain white hardwood; fabricate to detail.
- C. Window Aprons, Opaque Finish: Any closed-grain white hardwood; fabricate to detail.

2.13 SHOP FINISHING

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
- B. General: Finish architectural woodwork at fabrication shop as specified in this Section, except as noted. Defer only final touchup, cleaning, and polishing until after installation.
  1. Shop apply the prime coat including backpriming, if any, for standing and running trim specified to be field finished.
- C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
  1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork.
- D. Transparent Finish:
  1. Grade: Premium system for all casework grades.
  2. AWI Finish System: Catalyzed polyurethane.
  3. Staining: Match approved sample for color.

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4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.
- E. Opaque Finish: Field finish in Division 09 Section "Painting."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
  1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
  2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
  3. Wall Caps: Secure with countersunk head wood screws in concealed locations. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Use scarf joints for end-to-end joints.
- G. Corridor Handrails:
  1. General: Install rails with no more than 1/8 inch in 96-inch variation from a straight line.

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2. Corridor handrails shall be installed to withstand a downward load of at least 200 lbf, when tested according to method in ASTM F 446.

H. Cabinets:

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.
3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c.

I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Scribe backsplash to walls. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Install countertop brackets specified in Part 2. Painting of bracket specified in Division 09 Section "Painting."
4. Calk space between back of backsplash scribe and wall with sealant specified in Division 07 Section "Joint Sealants."

J. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

K. Refer to Division 09 Section "Painting" for final finishing of installed architectural woodwork not indicated to be shop finished.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064000



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SECTION 072100 - BUILDING INSULATION

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. Foam-plastic board insulation.
  - 2. Glass-fiber blanket insulation.
  - 3. Foam-in-place insulation.
  - 4. Insulation in frames of steel doors.
  - 5. Vapor retarders.
- B. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for fire-retardant wall sheathing applied over rigid insulation.
  - 2. Division 06 Section "Finish Carpentry" for Z-flashing over windows and doors to be sealed to the air barrier waterproofing.
  - 3. Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation."
  - 4. Division 07 Section "Under-Slab Vapor Retarders."
  - 5. Division 07 Section "Thermoplastic Membrane Roofing" for insulation specified as part of roofing construction.
  - 6. Division 09 Section "Gypsum Board Assemblies" for provision in metal-framed assemblies of acoustical insulation.
  - 7. Divisions 22 and 23 Sections for insulation on ducts, piping, and equipment.

1.3 DEFINITIONS

- A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

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- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency and bearing UL label. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to 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.
- B. Protect foam-plastic board insulation as follows:
  - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
  - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
  - 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 FOAM-PLASTIC BOARD INSULATION

- A. Perimeter Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 25 psiof type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
  - 1. Edge Condition: As follows:
    - a. Perimeter Insulation: Tongue and groove or shiplap edges
  - 2. Thickness: 2 inch, unless indicated otherwise.
  - 3. LTTR-Value: ASTM C 518; 10.6 for 2 inch thick board.
  - 4. Products:
    - a. Foamular 250; Owens Corning.
    - b. GreenGuard; Pactiv Building Products.
- B. Rigid Insulation for Installation over Air Barrier Waterproofing on Weather-Resistant Gypsum Sheathing applied to Cold-Formed Framing and at Louvers:
  - 1. Edge Condition: Tongue and groove or shiplap edges.
    - a. Provide square edge at louvers.
  - 2. Board Widths: 4 feet.
  - 3. Thickness: 1-inch; 2 inch at louvers.
  - 4. LTTR-Value: ASTM C 518; 5.0 for 1 inch thick board.

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- 5. Products:
  - a. Foamular 250; Owens Corning.
  - b. GreenGuard; Pactiv Building Products.
- C. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

### 2.3 GLASS-FIBER BLANKET (BATT) INSULATION

- A. Manufacturers:
  - 1. CertainTeed Corporation.
  - 2. Knauf Insulation.
  - 3. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket (Batt) Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Provide in thickness for full depth of cavity. Where cavity requires insulation that is thicker than standard size, install next larger size and compress into cavity.
  - 1. Provide insulation in standard density except as noted otherwise.
  - 2. Provide insulation with following minimum R-values:
    - a. Walls: R-19.
    - b. Roofs: R-32.

### 2.4 FOAM-IN-PLACE INSULATION

- A. Foam-In-Place Insulation, General Use: On-site foam-in-place insulation shall be Class 1 foam.
  - 1. Products:
    - a. Froth-Pac; Dow Chemical Company (The).
    - b. Touch 'n Foam Gun Foam Sealant; Convenience Products.
- B. Polyurethane Foam Insulation (Minimal Expansive) for Window and Door Perimeters: Single- or two-component, UL classified sealant, to insulate, seal, fill, and stop air infiltration; shall not expand to the point to cause pressure on window and door jambs.
  - 1. Density: ASTM D 1622, 1.0 - 1.8 lbs./cu. ft.
  - 2. R-Value: ASTM C 518, not less than 4.0 per inch of thickness.
  - 3. Fire-Test-Response Characteristics: ASTM E 84, as follows:
    - a. Flame Spread: Not greater than 25.
    - b. Smoke Developed: Not greater than 50.
  - 4. Products:
    - a. Dow Chemical Company (The); Great Stuff PRO Window & Door.
    - b. Fomo Products Inc.; Handi-Seal Window and Door Sealant.
    - c. Convenience Products; No-Warp Foam Window & Door Insulating Sealant.

### 2.5 VAPOR RETARDERS

- A. Vapor Retarders: CertainTeed MemBrain vapor retarder sheeting.
  - 1. Material: Polyamide (nylon) sheet, 2-mil thickness.
  - 2. Fire Resistance ASTM E84: Flame Spread Index 20; Smoke Developed Index 55.
  - 3. Vapor Permeance: ASTM E96, Less than 1. ASTM C665, greater than 10 at 60% RH.

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- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
  - 1. VOC Content of Interior Sealants: Provide interior sealants with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Adhesive for Bonding Vapor Retarder to Adjacent Construction: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
  - 1. VOC Content of Interior Adhesives: Provide interior adhesives with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Air-Vapor Barrier Box (Box Gasket): Air-vapor barrier box, constructed of high strength polyethylene with sealing flanges to permit installation of electrical boxes, insulation, and installation of wallboard without damage to vapor barrier.
  - 1. Coordinate installation and provide installation instructions to electrician during electrical rough-in.
  - 2. Location: Penetrations in vapor retarder.
  - 3. Product: LESSCO Air-Vapor Barrier Box; Lessco Low Energy Systems Supply Co., Inc., Campbellsport, WI 53010; phone: 920-533-8690; e-mail: [LESSCO@lessco-airtight.com](mailto:LESSCO@lessco-airtight.com).

2.6 AUXILIARY INSULATING MATERIALS

- A. Insulation Support Anchor: 25 gage, galvanized continuous metal support strip with pre-punched tabs at 8 inches on center.
  - 1. Product: Insul-hold; Insul-Hold Co., Inc.; phone (207) 465-9066.
- B. Rigid Insulation Tape: Moisture-resistant tape with UV-treated, polyethylene-film-reinforced top surface laminated to acrylic backer with release paper backing; use product by or approved by rigid insulation manufacturer for sealing joints in insulation.
  - 1. Width: Not less than 3-1/2 inches.
  - 2. Product: Owens Corning; Joint SealR Foam Joint Tape.
- C. Rigid Insulation Adhesive: Sto TurboStick single component polyurethane foam adhesive, compatible with air barrier waterproofing.
  - 1. Application Temperature: 35 degrees F minimum surface and ambient temperature.
- D. Rigid Insulation Mechanical Fasteners: Self-drilling screw fasteners, stainless steel or corrosion resistant coated with CR-10 organic-polymer coating, with minimum 2 inch diameter plastic plates as manufactured by OMG Roofing Products or approved equal.



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PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated. Butt joints tight and fasten in place to prevent displacement during the installation of work that conceals insulation. Fill voids in thermal envelope not covered by the work of other sections.
  - 1. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- E. Cut insulation straight and square using straight edge and square guide. Butt joints shall be tight and free of gaps .

3.3 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
  - 1. Extend insulation to top of footing, unless otherwise indicated.
  - 2. Seal end-to-end joints between units by applying sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with sealant as recommended by insulation manufacturer.
- B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Insulate under entire slab.

3.4 INSTALLATION OF METAL FURRING AND RIGID INSULATION

- A. At walls framed with cold-formed framing, install tongue-and-groove rigid insulation over wall sheathing with the tongue facing up. Offset end joints by not less than 2 feet from board below. Tape horizontal and vertical joints in insulation with tape centered over joint. Roll tape firmly

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in place to ensure intimate contact. Insulation shall be attached to the wall using one of the following methods:

1. Rigid Insulation Adhesive: Apply vertical adhesive ribbons to back of insulation board, located approximately 3/4-inch from both ends, and 5 additional ribbons spaced equally about 7 inches apart. Position board and lightly press board on to wall. Hold boards into place with mechanical fasteners as required to prevent board movement and displacement.
  2. Rigid Insulation Mechanical Fasteners: Fasten insulation with corrosion resistant screws with plastic stress plates spaced 16 inches on center along board edge and 24 inches on center in the field of the board so insulation stays in tight intimate contact with wall substrate. Drive fasteners so the stress plate is tight and flush with the board surface but do not countersink. Stress plates can bridge between adjoining board edges if the plate is a minimum of 1-3/4 inch diameter. Do not fasten more than two board edges with one stress plate.
- B. Cut rigid insulation flush with top of window and door trim to permit installation of z-flashing run back to air barrier waterproofing. After top flashing has been sealed to air barrier waterproofing, set rigid insulation tight to top of flashing and continue up wall.
- C. During installation, fill cracks and gaps between rigid insulation boards and between rigid insulation boards and adjacent construction with foam-in-place insulation sealant and trim flush with face of board.

### 3.5 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. 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. Fill voids in thermal envelope not covered by the work of other sections.
- B. Glass-Fiber Blanket (Batt) Insulation: Install in cavities formed by framing members according to the following requirements:
1. Install insulation support anchors at top of cavity and spaced 5 feet on center full length of each cavity.
  2. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  3. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  4. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
  6. Ceiling Insulation: Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

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- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equating a density of approximately 2.5 lb/cu. ft.

3.6 INSTALLATION OF FOAM-IN-PLACE INSULATION SEALANT

- A. Install foam-in-place insulation sealant to a minimum depth of 1 inch, sealing construction cracks and gaps where outside air and cold can infiltrate, providing an airtight building envelope. Fill cracks and gaps between rigid insulation boards and between rigid insulation boards and adjacent construction.

3.7 INSULATING STEEL DOOR FRAMES

- A. Exterior Frames: Steel door frames in exterior steel framed walls shall be filled with rigid insulation. Cut rigid insulation slab the full width of frame throat and insert continuous slab into door frame head and jambs before frame is installed.
  - 1. After frame is installed, fill remaining gap between rigid insulation and weather barrier with foam-in-place insulation.
  - 2. Foam remaining gaps with minimal expanding foam.

3.8 INSTALLATION OF VAPOR RETARDERS

- A. Air-Vapor Barrier Box: Installation: Seal vapor retarder to air-vapor barrier box in accordance with manufacturer's instructions, <http://www.lessco-airtight.com/instructions.htm>. Seal completely around wires with silicone sealant. If the hinged box option is used by electrical box installer, the cut made at top and bottom of the box shall be taped shut with 3M Contractor's Sheathing Tape. Cut vapor retarder at center of flanges of air-vapor barrier box and tape the vapor retarder to flanges of the air-vapor barrier box with vapor barrier tape, assuring tape is folded into the insides of the air-vapor barrier box.
  - 1. Insulate around the electrical box inside the air-vapor barrier box with fiberglass insulation, filling all voids around electrical box.
- B. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders continuously over exterior framing prior to installation of interior framing to protect from vapor transmission. Secure vapor retarders in place with spray adhesives, double sided tape, or other anchorage system that will vapor retarder in proper position . Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with spray-applied foam insulation and loose-fiber insulation.
  - 1. Seal vapor barrier to electrical wall boxes.
- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two framing members.
  - 1. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

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2. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
  3. Seal perimeter of vapor barrier and the perimeter of all openings in vapor barrier to framing with continuous bed of adhesive prior to fastening vapor barrier to framing.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Air-Vapor Barrier Box: Installation: Seal vapor retarder to air-vapor barrier box in accordance with manufacturer's instructions, <http://www.lessco-airtight.com/instructions.htm>. Seal completely around wires with silicone sealant. If the hinged box option is used by electrical box installer, the cut made at top and bottom of the box shall be taped shut with 3M Contractor's Sheathing Tape. Cut vapor retarder at center of flanges of air-vapor barrier box and tape the vapor retarder to flanges of the air-vapor barrier box with vapor barrier tape, assuring tape is folded into the insides of the air-vapor barrier box.
1. Insulate around the electrical box inside the air-vapor barrier box with fiberglass insulation, filling all voids around electrical box.
  2. At ceiling electrical boxes, provide vapor barrier pans sealed to vapor retarder, or seal fixture with foam-in-place insulation before installation of the attic insulation.
- F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.
- 3.9 PROTECTION
- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072110 - SPRAY-IN-PLACE RIGID URETHANE FOAM INSULATION

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 spray polyurethane foam insulation.
- B. Related Sections include the following:
  - 1. Division 05 Section "Cold-Formed Metal Framing" for coordination with application of spray-applied foam insulation.
  - 2. Division 07 Section "Building Insulation."

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers with labels indicating manufacturer, product name and designation, and directions for storing and mixing with components.
- 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. Store materials covered, out of direct sunlight, and at temperatures between 60 deg F and 70 deg F.
- C. Dispose of empty containers by technicians in accordance with manufacturer's recommendations, current law, and industry standard practice.

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1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply material when ambient or substrate temperature is 50 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application. Do not apply material when moisture due to dew, frost or water is present on substrate materials.

PART 2 - PRODUCTS

2.1 SPRAY POLYURETHANE FOAM (SPF) INSULATION

- A. Closed-Cell Polyurethane Foam Insulation (SPF): ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84; with non-ozone depleting blowing agent.
1. Density: ASTM D 1622; minimum density of 2.0 lb/cu. ft.
  2. Thermal Resistivity (R-Factor), LTTR: Not less than 6.4 per inch of thickness.
  3. Closed Cell Content: ASTM D 2856, 90 percent minimum.
  4. Vapor Permeance: ASTM E 96, 1-inch thickness, 1.2 perms maximum.
  5. Fungi Resistance: ASTM C 1338, no growth.
  6. Applied Thickness: Apply to provide a cured thickness as indicated. Where thickness is not indicated, provide a cured thickness of not less than 2-1/2 inches and not more than 4 inches.
  7. Locations: Exterior walls; and where indicated.
  8. Products:
    - a. BASF Spraytite Insulation 81206.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Mask and cover items not indicated to receive insulation, protecting from fallout or overspray of materials during application.
- B. Brush down substrates to loosen and remove cobwebs, dirt, dust and debris. Upon completion of operations, substrate shall be clean of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION OF SPRAY POLYURETHANE FOAM INSULATION

- A. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Apply in consecutive passes as recommended by the manufacturer to achieve specified thickness.
- B. Apply insulation at wall and to seal voids at interface of top of walls and roof deck.
- C. To the maximum extent possible, apply insulation as uniformly and smooth as possible.

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3.3 CLEANING

- A. Cleaning: Remove material overspray, and protection materials from surfaces of other construction and clean exposed surfaces. Remove trash and debris from the project site and properly dispose of.

END OF SECTION 072110





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SECTION 072713 - MODIFIED BITUMINOUS SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes self-adhering, vapor-retarding, modified bituminous sheet air barriers.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wall sheathings.

1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.

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1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Include details of interfaces with other materials that form part of air barrier.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- B. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.7 QUALITY ASSURANCE

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

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
  1. Protect substrates from environmental conditions that affect air-barrier performance.
  2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

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2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 283.

2.3 SELF-ADHERING SHEET AIR BARRIER

- A. Modified Bituminous Sheet: 40-mil- thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick, cross-laminated polyethylene film with release liner on adhesive side and formulated for application with primer that complies with VOC limits of authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.; CCW-705.
    - b. Grace, W. R. & Co. - Conn.; Perm-A-Barrier Wall Membrane.
    - c. Henry Company; Blueskin SA.
    - d. Meadows, W. R., Inc.; SealTight Air-Shield.
    - e. Tremco Incorporated, an RPM company; ExoAir 110/110LT.
  - 2. Physical and Performance Properties:
    - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
    - b. Tensile Strength: Minimum 250 psi; ASTM D 412, Die C.
    - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
    - d. Puncture Resistance: Minimum 40 lbf; ASTM E 154.
    - e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg F; ASTM D 570.
    - f. Vapor Permeance: Maximum 0.05 perm; ASTM E 96/E 96M, Water Method.

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier membrane.
- B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
- C. Counterflashing Strip: Modified bituminous 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, cross-laminated polyethylene film with release liner backing.

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- D. Modified Bituminous Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick, cross-laminated polyethylene film with release liner backing.
- E. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.
- F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- H. Sprayed Foam Sealant: Refer to Division 07 Section "Thermal Insulation" for spray foam insulation applied at doors and windows.
- I. Modified Bituminous Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- J. Expansion/Seismic Joint: Provide Elastomeric Flashing Sheet; ASTM D 2000, minimum 50- to 65-mil- thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.
- K. Joint Sealant: Provide one of the following:
  - 1. Dow Corning Corporation; 790.
  - 2. GE Construction Sealants; SCS2700 SilPruf LM.
  - 3. Tremco Incorporated: Spectrem 1.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.

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- B. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- C. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### 3.3 INSTALLATION

- A. General: Install modified bituminous sheets and accessory materials according to air-barrier manufacturer's written instructions and according to recommendations in ASTM D 6135.
  - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.
- B. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
  - 1. Install modified bituminous strips centered over vertical inside corners. Install 3/4-inch fillets of termination mastic on horizontal inside corners.
- C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.
- D. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
- E. Apply and firmly adhere modified bituminous sheets horizontally over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
  - 1. Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.
  - 2. Roll sheets firmly to enhance adhesion to substrate.
- F. Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.
- G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, modified bituminous strip.
- H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
  - 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

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2. Install modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
  - J. Connect and seal exterior wall air-barrier membrane continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
  - K. Vinyl Windows: After windows are installed, strip in around window head and jambs with reinforcing mesh, lapping on to nailing fins and on to the air barrier membrane to provide a water tight and air tight seal.
    1. At Anderson windows, apply transition membrane system on to face of window nailing fins.
  - L. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier membrane with foam sealant.
  - M. At end of each working day, seal top edge of air-barrier material to substrate with liquid membrane.
  - N. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
  - O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.
  - P. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
  - Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.
- 3.4 CLEANING AND PROTECTION
- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
    1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
    2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

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- B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 072713





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SECTION 073113 - ASPHALT SHINGLES

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. Asphalt shingles.
  - 2. Underlayment.
  - 3. Ridge vents.
  - 4. Repairs to existing roof as required.
- B. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for roof sheathing.
  - 2. Division 07 Section "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for interface between membrane roofing and asphalt shingle installation.
  - 3. Division 07 Section "Sheet Metal Flashing and Trim" for metal drip edges, rake edges, and flashings not part of this Section.
- C. Products installed, but not furnished, under this Section include the following:
  - 1. Metal roof penetration flashings, drip edges, rake edges, and apron flashing, furnished under Division 07 Section "Sheet Metal Flashing and Trim."

1.3 DEFINITION

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of asphalt shingle indicated.
- C. Samples for Verification: For the following products, of sizes indicated, to verify color selected:
  - 1. Asphalt Shingle: Full size.

1.5 INFORMATIONAL SUBMITTALS

- A. Installation Instructions: Submit shingle manufacturer's and waterproof underlayment manufacturer's written installation instructions. Variations between the manufacturers' printed instructions and these Specifications shall be noted in the submittal.

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1. Shingle fasteners and nailing methods shall be approved in writing by the shingle manufacturer.

B. Research/Evaluation Reports: For each type of asphalt shingle required, from the ICC.

C. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.

B. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

A. Installation Requirements: Roofing work shall be applied in strict accordance with provisions of specification criteria. No deviations shall be permitted without written consent from the Architect. Should a conflict between this specification and the manufacturer's requirements arise, the most restrictive provision as determined by the Architect shall govern.

B. Source Limitations: Obtain roof shingles, including ridge and hip cap shingles from single source from single manufacturer.

C. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.

B. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Do not stack bundles of shingles more than 4 feet high. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

C. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written

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instructions and warranty requirements and when substrate is completely dry. Roofing shall not be applied when ambient air temperature is less than 40 deg F.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.
- B. New and temporary construction, including equipment and accessories, shall be secured from wind damage or blow-off. All temporary work or work by others damaged from failure to properly secure the work shall be replaced with new materials at no additional cost to the Owner.
- C. Underlayments shall not be left exposed for more than 30 days per manufacturer's requirements. Material left exposed for more than 30 days shall be removed and replaced. Material may be left in place and covered over with new underlayment as long as no telegraphing of substrate through the shingles occurs.

#### 1.10 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Manufacturing defects.
    - b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
    - c. Deformation or deterioration of asphalt shingles beyond normal weathering.
  2. Material Warranty Period: Manufacturer's Limited Lifetime Warranty, defined in warranty literature as not less than 40 years from date of Substantial Completion, prorated, with first ten years nonprorated and covering 100 percent material and labor costs.
  3. Wind-Speed Warranty Period: Asphalt shingles shall resist blow-off or damage caused by wind speeds up to 130 mph minimum for not less than 10 years from date of Substantial Completion.
  4. Workmanship Warranty Period: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
  1. Product: GAF; Timberline HD Shingles.
  2. Butt Edge: Straight cut.
  3. Strip Size: Manufacturer's standard.
  4. Color and Blends: Weathered Wood to match existing roof.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.
- C. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

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2.2 UNDERLAYMENT MATERIALS

- A. High-Performance Synthetic Underlayment: Polymer-based, water-resistant, UV-stabilized underlayment.
  - 1. Products: Subject to compliance with requirements, provide the following product or approved substitute:
    - a. Diamond Deck by Certainteed.
    - b. Roof Top Guard II by RKW US, Inc.
    - c. Tri-Flex Extreme by Grace Construction Products.
    - d. Rex SynFelt by Alpha ProTech.
- B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil-thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
  - 1. Products:
    - a. W. R. Grace & Co.; Grace Ice and Water Shield.
    - b. Carlisle Coatings & Waterproofing; CCW WIP.

2.3 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; stainless-steel, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch-diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through plywood sheathing.
  - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing to prevent galvanic action.
  - 2. Where nails are fastened into pressure preservative blocking or sheathing, use stainless steel fasteners.
  - 3. Use of staples will not be permitted.
- C. Underlayment Nails: Stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter. Staples not permitted.

2.4 METAL FLASHING AND TRIM

- A. General: Furnished in Division 07 Section "Sheet Metal Flashing and Trim" for installation in this Section.
- B. Vent Pipe Flashing: Pipes penetrating shingled roofs shall be ARFCO self-sealing neoprene collar with aluminum flange.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
- B. If unacceptable conditions are encountered, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with noncorrosive roofing nails.
- B. Verify that surfaces are free of cracks, depressions, or waves that may be detrimental to successful installation.
- C. Verify that gap in sheathing at ridge is consistent and is meeting the ventilation requirements.
- D. Coordinate installation with flashings and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and are securely fastened against movement.

3.3 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Single-Layer Synthetic Underlayment: Install on roof deck parallel with and starting at the eaves. Lap sides a minimum of 2 inches over underlying course. Lap ends, hips and valleys a minimum of 6 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with synthetic underlayment nails to hold underlayment in place until asphalt shingle installation; do not use staples. Seal end laps with asphalt plastic cement. Turn up synthetic underlayment not less than 4 inches at vertical walls, curbs, chimneys and other roof projections.
  - 1. Install synthetic underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of synthetic underlayment over self-adhering sheet underlayment not less than 3 inches in direction to shed water. Lap ends of synthetic underlayment not less than 6 inches over self-adhering sheet underlayment as recommended by manufacturer, but not less than 6 inches, and seal with asphalt plastic cement, and seal with asphalt plastic cement.

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2. Install fasteners at no more than 15 inch o.c. vertically and 12 inch o.c. horizontally in field; 6 inch o.c. on vertical side and end laps.
- C. Self-Adhering Sheet Underlayment: Install in accordance with manufacturer's written instructions, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
1. Eaves: Extend from edges of eaves not less than 5-1/2 feet beyond interior face of exterior wall.
  2. Rakes: Extend from edges of rake 36 inches beyond interior face of exterior wall.
  3. Valleys: Extend from lowest to highest point; center one row in valley and overlap with two additional rows on each side for a distance of not less than 48 inches out from each side of valley centerline. Lap roof underlayment over valley underlayment not less than 6 inches and seal with asphalt plastic cement.
  4. Hips: Extend 18 inches on each side.
  5. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
  6. Sidewalls: Extend beyond sidewall not less than 6 feet, and return vertically against sidewall not less than 8 inches.

### 3.4 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal provided in Division 07 Section "Sheet Metal Flashing and Trim" according to recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- C. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.
- D. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

### 3.5 ASPHALT SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Install self-sealing starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed with self-sealing strip face up at roof edge.
  1. Extend asphalt shingles 1/4 inch over fasciae drip edge at eaves and rakes.
  2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure. Use vertical and horizontal chalk lines to ensure straight coursing.

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- D. Stop uncompleted rows in a stepping configuration. Racking is not permitted.
- E. Fasten asphalt shingle strips with a minimum of five roofing nails located according to manufacturer's written instructions. Use of staples will not be permitted.
- F. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches beyond center of valley. Use one-piece shingle strips without joints in valley. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches short of valley centerline. Trim upper concealed corners of cut-back shingle strips.
  - 1. Do not nail asphalt shingles within 6 inches of valley center.
  - 2. Set trimmed, concealed-corner asphalt shingles in a 3-inch- wide bed of asphalt roofing cement.
- G. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
  - 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

### 3.6 ADJUSTING

- A. Replace any damaged materials installed under this Section with new materials that meet specified requirements.

### 3.7 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS **<Insert name>** of **<Insert address>**, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
  - 1. Owner: **<Insert name of Owner>**.
  - 2. Address: **<Insert address>**.
  - 3. Building Name/Type: **<Insert information>**.
  - 4. Address: **<Insert address>**.
  - 5. Area of Work: **<Insert information>**.
  - 6. Acceptance Date: **<Insert date>**.
  - 7. Warranty Period: **<Insert time>**.
  - 8. Expiration Date: **<Insert date>**.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
  - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. Lightning;

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- b. Peak gust wind speed exceeding 130 mph;
  - c. Fire;
  - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
  - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
  - f. Vapor condensation on bottom of roofing; and
  - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
  3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
  4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
  5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
  6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
  7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

- E. IN WITNESS THEREOF, this instrument has been duly executed this **<Insert day>** day of **<Insert month>**, **<Insert year>**.
1. Authorized Signature: **<Insert signature>**.
  2. Name: **<Insert name>**.
  3. Title: **<Insert title>**.

END OF SECTION 073113



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SECTION 074630 - VINYL SIDING

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. Vinyl siding.
  - 2. Vinyl soffit.
- B. Related Sections include the following:
  - 1. Division 06 Section "Finish Carpentry" for PVC corner boards; for exterior trim; and for wood siding for repairing existing sheds.
  - 2. Division 07 Section "Modified Bituminous Sheet Air Barrier" for building air infiltration barrier.
  - 3. Division 07 Section "Joint Sealants."

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated. Include manufacturer's printed installation instructions.
  - 1. Submit siding manufacturer fastener requirements to demonstrate 100 mph wind load design, with 36 psf positive and negative wind pressure for components and cladding.
  - 2. Submit manufacture's recommendation for size of truss head screws.
- C. Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors, textures, and patterns available for siding, and soffit.
- D. Submit ICC-ES Evaluation Report for siding fasteners.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Siding and Soffit: Obtain each type, color, texture, and pattern of siding and soffit, including related accessories, through one source from a single manufacturer.
- B. Installer: Engage Installer with not less than three years of experience with products specified.
- C. Fire-Test-Response Characteristics: Provide vinyl siding 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.

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1. Flame Spread Index: ASTM E 84, 20 or less.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Meet at Project site with Owner, Architect, Installer, siding manufacturer representative, and installers of related Work. Review specified requirements, proper sequence and installation of all related products. Record discussions and agreements and furnish copy to each participant. Provide at least 5 business days advance notice to participants prior to convening preinstallation conference.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver vinyl siding, components, and other manufactured items so as not to be damaged or deformed. Package vinyl siding for protection during transportation and handling.
- B. Store materials in a dry, well-ventilated, weathertight place.
- C. Comply with each manufacturer's recommendations for storage and handling of materials, including accessory products.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions.
- B. Substrate: Proceed with siding work only after substrate construction and penetrating work have been completed.

1.7 SEQUENCING

- A. Coordinate installation with flashings, rigid insulation, air barrier waterproofing, weather barrier and other adjoining construction to ensure proper sequencing.

1.8 WARRANTY

- A. General: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace siding and soffits that does not comply with requirements or that fail within specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering.
  - 1. Fading is defined as loss of color, after cleaning with product recommended by manufacturer, of more than 4 Hunter color-difference units as measured according to ASTM D 2244.
  - 2. Warranty Period: 50 years from date of Substantial Completion, prorated, with first five years nonprorated and covering 100 percent material and labor costs.

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PART 2 - PRODUCTS

2.1 SIDING

- A. Vinyl Siding: Integrally colored, vinyl siding complying with ASTM D 3679.
1. Product: Monogram 46L; CertainTeed Corp.
  2. Horizontal Pattern: 8-inch exposure in plain, double 4-inch board style.
  3. Texture: Wood grain.
  4. Minimum Nominal Thickness: 0.046 inch.
  5. Minimum Profile Depth (Butt Thickness): 3/4 inch.
  6. Nailing Hem: Double thickness.
  7. Length: Not less than 16 feet 8 inches.
  8. Wind Load Resistance: Fasten siding at 16 inches o.c. to withstand negative wind load pressure of 40 psf when tested according to ASTM D 5206, standard test method.
  9. Flame Spread and Smoke Development Index: Class 1 flame spread less than 25 and smoke developed less than 450 when tested in accordance with ASTM E 84.
  10. Rate of Burning: ASTM D 635; Classified CC1, self-extinguishing with no measurable extent of burn.
  11. Radiant Heat Flux: No sustained flame in accordance with NFPA 268.
  12. Color for Vinyl Siding: As selected by Architect from manufacturer's full range.
- B. Shingle Siding: Integrally colored, vinyl siding complying with ASTM D 3679.
1. Product: Alside, Inc.; Architectural Classic Shingles.
  2. Pattern: Replicates straight edge cedar shingles with 7-inch exposure.
  3. Length: Not less than 10 feet
  4. Texture: Replicating classic wood shingle.
  5. Profile Depth (Butt Thickness): 5/8 inch.
  6. Wind Load Resistance: Fasten siding at 16 inches o.c. to withstand negative wind load pressure of 36 psf when tested according to ASTM D 5206, standard test method.
  7. Flame Spread and Smoke Development Index: Class 1 when tested in accordance with ASTM E 84.
  8. Rate of Burning: ASTM D 635; self-extinguishing with no measurable extent of burn.
  9. Colors for Vinyl Siding: To be selected from manufacturer's standard colors.

2.2 SOFFIT

- A. Vinyl Soffit: Integrally colored, vinyl soffit complying with ASTM D 4477.
1. Pattern: 10-inch exposure, double 5 inch -inch board style with 3/4-inch groove, hidden perforations.
  2. Texture: Smooth.
  3. Ventilation: Provide soffit with concealed perforations.
    - a. Net Free Air Space: 10 sq. in./square foot.
  4. Minimum Nominal Thickness: 0.048 inch.
  5. Minimum Profile Height: 3/4 inch.
  6. Colors for Vinyl Soffit: As selected by Architect from manufacturer's standard colors.
  7. Product: CertainTeed Corporation; Vinyl Carpentry InvisiVent Triple 3-1/3 Inch Super Ventilated Soffit.

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2.3 ACCESSORIES

- A. Siding Accessories: Provide starter strips, edge trim, corner cap, and other items as recommended by siding manufacturer for building configuration.
  - 1. Provide accessories made from same material as adjacent siding, unless otherwise indicated.
  - 2. Provide accessories matching color and texture of adjacent siding, unless otherwise indicated.
  
- B. Vinyl Accessories: Where vinyl accessories are indicated, provide integrally colored vinyl accessories complying with ASTM D 3679 except for wind-load resistance.
  - 1. Texture: Wood grain.
  
- C. Fasteners:
  - 1. Fasteners: ASTM C 1513 truss head wood screws with minimum 3/8-inch diameter head, or round head screws with 5/8-inch diameter nylon washers, ASTM C 1513, in size recommended by siding manufacturer for conditions indicated above, but not less than #8 x 3/4 inches.
    - a. Finish stainless steel or with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of siding.
  
- B. Verify that building weather barrier has been properly installed and will provide free drainage of water migrating behind panels to exterior. Verify that windows have been taped in and applied over flashing to shed water to exterior. Arrange for satisfactory correction of any breaks, gaps, tears or other defects in the underlayment material before installing siding.
  
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.3 SIDING INSTALLATION

- A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Center nails in elongated nailing slots without binding siding to allow for thermal movement. Overlap joints to shed water away from approaching pedestrian traffic to minimize appearance of joints. Install subsequent courses to form a weathertight surface.
  
- B. Install vinyl siding, soffit, and accessories according to ASTM D 4756.
  - 1. Do not install damaged components.

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2. Install starter strip and trim as indicated and as recommended by manufacturer of siding system.
3. Where siding terminates at dissimilar materials, including storefront and doors, provide J-trim around entire opening. Siding butting trim that does not have an integral j-channel receiver, provide continuous vinyl j-channel with color to match siding. Miter intersecting corners of trim.
4. Trim shall be one-piece without joints, except where lengths exceed manufactured lengths. Do not use any piece less than 2 feet long. Provide fasteners within 2 inches of end terminations.
5. Where top of siding is cut, snap lock punch top of panel and secure in undersill trim. Shim undersill trim maintain proper pitch of siding without distortion. Undersill trim shall be concealed within a J-channel trim.
6. Install siding plumb and level with joints properly interlocked.
7. Panel ends abutting roof or similar conditions shall be cut to follow angle and shall be attached to backup; keep panel level and prevent bowing of panel.
8. Spacing: Allow space between both ends of siding panels and trim for thermal movement. Overlap horizontal panel ends 1/8- to 1/4-inch, based on daily temperature of siding at time of installation.
9. Where top course of siding terminates at eaves, soffits, and similar conditions, provide L-cover and L-receiver to conceal top attachment.
10. Fasten siding as recommended by manufacturer for the indicated wind speeds. Provide fasteners within 2 inches of end terminations at trims.

- C. Lap Joints: Stagger lap joints in random pattern as successive courses of siding are installed. Provide at least three vertical courses between lap joints aligning vertically and at least 4 feet horizontally between adjacent courses. Do not lap siding above or below windows, or above doors. Siding shall be one-piece without joints, except where lengths exceed manufactured lengths. Do not use any piece less than 3 feet long.
1. Clapboard siding runs 16 feet 8 inches and less shall be installed as full length, one-piece sections.
  2. Shingle siding runs 5 feet and less shall be installed as full length, one-piece sections.

### 3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective siding materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074630



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SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

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. Adhered TPO membrane roofing system.
  - 2. Protection of existing roofing system to remain.
- B. Related Sections:
  - 1. Division 02 Section "Selective Demolition and Alterations" for requirements to maintain building in weathertight condition during roof removals.
  - 2. Division 06 Section "Rough Carpentry" for roof sheathing, wood nailers, curbs, and blocking.
  - 3. Division 07 Section "Building Insulation" for insulation beneath the roof deck.
  - 4. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.

1.3 DEFINITIONS

- A. TPO: Thermoplastic polyolefin.
- B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

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- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
  - 1. Corner Uplift Pressure: 74 lbf/sq. ft.
  - 2. Perimeter Uplift Pressure: 50 lbf/sq. ft.
  - 3. Field-of-Roof Uplift Pressure: 36 lbf/sq. ft.
  
- D. Roof flashing details shall be consistent with those shown on Drawings. Where cap flashing is shown, a standard manufacturer's bar anchor only detail is not acceptable. Membrane manufacturer's recommended flashing detail may be considered by the Architect when no detail is provided.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
  
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
  - 3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
  - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
  
- C. Samples for Verification: For the following products:
  - 1. Sheet roofing, of color specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Installer Qualification Data: For qualified Installer signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
  
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
  
- C. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For membrane roofing system to include in maintenance manuals.
  
- B. Warranties: Special warranties specified in this Section.



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1.8 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. **Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by existing membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- C. **Source Limitations:** Obtain components for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- D. **Exterior Fire-Test Exposure:** ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. **Insulation Fire Performance Characteristics:** Provide insulation and related materials with the fire-test-response characteristics specified elsewhere in this Section 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 Characteristic: ASTM E 84.
  - 2. Fire Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.
- F. **Fire-Resistance Ratings:** Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- G. **Roofing work shall be applied in strict accordance with the provisions of the specification criteria. No deviations shall be permitted without written consent from the Architect. Should a conflict between this specification and the manufacturer's requirements arise, the most restrictive provision as determined by the Architect shall govern.**
- H. **Upon completion of the installation, an inspection shall be made by the roofing system manufacturer to ascertain that the roofing system has been installed according to applicable manufacturer's specifications and details. No "early bird" warranty will be accepted. Results of the warranty inspection shall be submitted in writing to Owner and Architect for their review and records.**
- I. **Preinstallation Roofing Conference:** Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

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3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review protection of existing building occupants and air handlers from adhesive fumes during installation.
5. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for new and existing roofing system during and after installation of sloped roof framing and roof installation.
  - a. Review staging, material placement, construction activity and pedestrian traffic protection requirements for work areas and access paths to areas where work will occur on completed membrane roofing.
10. Review roof observation and repair procedures after roofing installation.
11. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
12. Provide 5 business days minimum advance notice to participants prior to convening preinstallation conference.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
  1. Insulation and cover board shall be stored on pallets, not less than 4 inches off ground, tightly covered with waterproof, "breathable" materials. Protect insulation from direct sunlight.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
  1. Do not overload any portion of building, either by use of or placement of equipment, storage of debris, or storage of materials. Construction loads shall not exceed 25 pounds per square foot.

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- E. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat, and cold by covering, patching and sealing, enclosing, ventilation, cooling and/or heat.
- F. Materials shall be delivered in sufficient quantity to allow continuity of Work.
- G. Materials, which are damaged, shall be removed and replaced at Installer's expense.

1.10 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
  - 1. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat, and cold by covering, patching and sealing, enclosing, ventilation, cooling and/or heat.
- B. Proceed with work so new and existing roofing materials are not subject to construction traffic. When construction traffic is necessary, new and existing roof sections shall be protected with plywood or other appropriate material to prevent damage; remove protection after construction traffic has ceased and re-inspected for possible damage to new and existing roofing.
- C. Upon completion of sloped roof framing and roofing, TPO membrane roofing shall be inspected for possible damage from installation of sloped roofing.
- D. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease. No work shall proceed when moisture is present on roof or in substrate materials.
- E. Temporary Waterstops: Install at end of each workday and remove before proceeding with next day's work.
- F. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- G. Protect existing roofing to remain at access locations, work areas and construction traffic locations with plywood or other appropriate material to prevent damage to existing roof system. Remove upon completion of Work.
- H. If exterior walls are not erected at time of membrane installation, envelop roof edge to prevent moisture intrusion and wind damage.
- I. Coordinate shut down or covering of air-handling ducts whenever possible during roofing activities to prevent fumes from adhesives from entering the building. The covering or shut-down of air-handling ducts shall be approved by the Owner prior to starting the work.
- J. Coordinate work with that of other trades effecting or effected by Work of this Section. Cooperate with such trades to ensure steady progress of all work under this contract.

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1.11 WARRANTY

- A. Existing Warranty for Exposed Roof: Perform work that is acceptable to maintain existing manufacturer's standard warranty, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. The maximum wind speed coverage shall be peak gusts of 72 mph measured at 10 meters above ground level. Warrantor shall be the manufacturer of the roofing membrane.
- B. When the Warrantor is notified that there is a problem (leak or damage) with warranted roofing system and/or accessories by telephone, and/or in writing (fax, e-mail or mail), the response time to physically start repairs shall be within twenty-four hours from time of telephone or date of written notification.

PART 2 - PRODUCTS

2.1 TPO MEMBRANE ROOFING

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
  - 1. Manufacturers: Subject to compliance with requirements, provide products that match existing.
  - 2. Thickness: 60 mils, nominal.
  - 3. Exposed Face Color: Gray to match existing.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  - 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Gypsum Board and Panel Adhesives: 50 g/L.
    - c. Multipurpose Construction Adhesives: 70 g/L.
    - d. Fiberglass Adhesives: 80 g/L.
    - e. Contact Adhesive: 80 g/L.
    - f. Other Adhesives: 250 g/L.
    - g. Single-Ply Roof Membrane Sealants: 250 g/L.
    - h. Nonmembrane Roof Sealants: 300 g/L.
    - i. Sealant Primers for Nonporous Substrates: 250 g/L.
    - j. Sealant Primers for Porous Substrates: 775 g/L.

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- B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard, State of Maine VOC Compliant.
- D. Slip Sheet: Manufacturer's standard, of thickness required for application.
- E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

### 2.3 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  - 1. Insulation LTTR-Values: Not less than R-6 per inch.
  - 2. Thickness: As indicated on the drawings.
  - 3. Products:
    - a. Carlisle SynTec Inc.; Polyiso HP-H.
    - b. Dow Chemical Co.; Hy-Therm AP.
    - c. Firestone Building Products Co.; ISO 95+.
    - d. Johns Manville International, Inc.; E'nerg'y 3.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

### 2.4 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

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- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

#### 3.3 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

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- E. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
  - 1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof as determined in accordance with ASCE 7, but in no case, provide less than one anchor per 4 sq. ft. of surface area (8 fasteners per 4 x 8 foot board).
    - a. In no case shall there be less than 2 fasteners per piece of insulation.
  - 2. Screws shall be installed utilizing automatic, positive clutch disengaged and adjustable nosepiece.

### 3.4 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Fully Adhered Membrane: Install membrane by unrolling over prepared substrate, lapping adjoining sheets as recommended by manufacturer. Apply adhesive to surfaces to be bonded and roll into place when adhesive has properly cured. Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation.
  - 1. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps. Position sheets to accommodate contours of roof deck to avoid bucking water.
  - 2. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
  - 3. Flashing details shall be done in accordance with the approved shop drawings. Base flashing shall be properly terminated and covered with counterflashing, providing not less than a 4-inch overlap.
- D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing membrane roofing system.

### 3.5 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions and approved Shop Drawings.
- B. At roof edges, flashing shall run under metal coping and flashing full length and width. Membrane shall extend down wall at least 1-inch past bottom of wood nailer, lapping over wall finish, but not exposed below the flashing.

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- C. Flash all projections including pipes, conduits, and curbs passing through the membrane.
  - 1. Flash pipes and conduits with pre-molded cone type flashing boots. Do not field fabricate pipe flashing.
- D. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- E. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- F. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- G. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  - 1. Notify Architect or Owner 5 business days in advance of date and time of inspection.
- B. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423



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SECTION 076200 - 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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
  - 1. Manufactured roof edge flashings.
  - 2. Formed steep-slope roof flashing and trim.
  - 3. Formed counterflashing and base flashing.
  - 4. Miscellaneous sheet metal accessories.
- B. Related Sections include the following:
  - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Division 06 Section "Finish Carpentry" for Z-cap flashing in conjunction exterior trim.
  - 3. Division 07 Section "Asphalt Shingles" for installing sheet metal flashing and trim integral with roofing.
  - 4. Division 07 Section "Thermoplastic Membrane Roofing" for installing sheet metal flashing and trim integral with roofing membrane.
  - 5. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. SPRI Wind Design Standard for Manufactured Roof Edge Flashings: Manufacture and install roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Wind Uplift:
    - a. Corner Uplift Pressure: 74 lbf/sq. ft..
    - b. Perimeter Uplift Pressure: 50 lbf/sq. ft..
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. 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.

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- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

#### 1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and installation instructions.
- C. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Provide layouts at 1/4-inch scale and details at 3-inch scale. Include the following:
  - 1. Identify material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
  - 4. Details of connections to adjoining work.
- D. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Warranties: Special warranties specified in this Section.
- G. Test Results: Submit manufacturer documentation that the custom fabricated roof edge has been tested and complies with ANSI/SPRI ES-1.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design, forming method, and extent to that indicated for this Project and with a record of successful in-service performance for ten years.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual, Fifth Edition." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

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1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
5. Provide not less than 5 business days advance notice to participants prior to convening preinstallation conference.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.
- B. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation to ensure a weathertight installation.

1.8 WARRANTY

- A. General: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Installer's warranty, on warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of custom-fabricated sheet metal flashing and trim that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Loose parts.
    - c. Wrinkling or buckling.
    - d. Failure to remain weathertight, including uncontrolled water leakage.
  2. Warranty Period: Two years for date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 SHEET METALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
  2. Exposed Finishes: Apply the following coil coating:
    - a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      - 1) Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2605, except as modified below:
        - a) Humidity Resistance: 2000 hours.
        - b) Salt-Spray Resistance: 2000 hours.
      - 2) Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
  2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
  3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications recommended by manufacturer of metal and fabricator of components and

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complying with requirements to seal joints in sheet metal flashing and trim and remain watertight.

- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- F. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non- drying, nonmigrating sealant.
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- H. 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 as required for performance.

#### 2.4 MANUFACTURED ROOF EDGE FLASHINGS

- A. Roof Edge Fascia: Two-piece, roof edge fascia consisting of snap-on metal fascia cover, in section lengths not exceeding 12 feet with concealed splice plates and a continuous formed galvanized steel sheet cant dam, 0.028 inch thick, 24 gage, minimum, with integral drip edge cleat to engage fascia cover. Provide matching factory-mitered and welded corner units.
  - 1. Products:
    - a. MM Systems Corporation; F-Series.
    - b. W. P. Hickman Company; Econosnap 2, EC2 Series.
    - c. Metal-Era, Inc.; Perma-Tite System 200, FA Series.
  - 2. Fascia Cover Material: Prefinished, aluminum-zinc alloy-coated sheet steel, not less than 0.028 inch thick, 24 gage.
  - 3. Face Height: Manufacturer's standard; not less than 5 inches.
  - 4. Color: As selected by Architect from manufacturer's full range of options.

#### 2.5 CUSTOM FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim in minimum 96-inch- lengths, but not exceeding 10-foot- long sections.
- D. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
  - 1. Seams: Fabricate nonmoving seams in accessories with flat-lock seams.

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- E. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- F. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the 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 elastomeric sealant concealed within joints.
- G. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or other permanent separation as recommended by manufacturer/fabricator.
- H. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- I. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
  - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

## 2.6 CUSTOM FABRICATED FLASHING SCHEDULE

- A. Drip Edge at Shingles Eave and Rake: SMACNA, Figures 4-22C and 4-22D, modified to provide 3/4 inch drip projection at shingle line, fabricated from prefinished aluminum-zinc alloy-coated sheet, minimum 24 gage thickness; color as selected by Architect to match trim.
- B. Metal Cladding for Wood Trim: Fabricate to detail from prefinished aluminum-zinc alloy-coated sheet, minimum 24 gage thickness; bend metal to clad wood trim with metal break; color as selected by Architect.
- C. Two-Piece Roof Edge Fascia at Existing Roof Modifications: Fabricate to match existing, prefabricated from anodized aluminum sheet, not less than 0.040 inch thick; color to match existing.

## 2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
  - 1. Underlayment: Where installing metal flashing directly on wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
  - 2. Bed flanges in thick coat of water cutoff mastic where required for waterproof performance.
- C. Install sheet metal flashing and trim with minimum number of joints practical, using manufactured or shop fabricated full-length pieces. Provide one piece flashing and trim using full-length pieces without joints where run is less than the 8 to 10 foot fabricated lengths. Do not use pieces less than 24 inches long.
  - 1. Sill Flashing at Openings: Provide one piece flashing, full width of opening except where opening exceeds available manufactured/fabricated lengths. Provide sealed metal end dams at ends of sills. Sills flashing shall turn up on back side to form pan, directing water to the exterior.
- D. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- E. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- F. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 1. Cleats shall be continuous, unless otherwise noted.
- G. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or

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intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

- H. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
  - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- I. Seal joints with elastomeric sealant as required for watertight construction.
  - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  - 2. Prepare joints and apply sealants to comply with installation requirements in Division 07 Section "Joint Sealants."

### 3.3 INSTALLATION OF MANUFACTURED ROOF FLASHINGS

- A. General: Install manufactured roof flashings according to manufacturer's written instructions. Anchor to resist specified uplift and outward forces. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
  - 1. Install manufactured roof flashings with provisions for thermal and structural movement.
  - 2. Torch cutting of manufactured roof specialties is not permitted.
  - 3. Do not use graphite pencils to mark metal surfaces.
- B. Install manufactured roof flashings level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- C. Install manufactured roof flashings to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
- D. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties.

### 3.4 CUSTOM FABRICATED FLASHING AND TRIM INSTALLATION

- A. General: Except as otherwise indicated, install sheet metal flashing and trim comply with fabricator's installation instructions, performance requirements, and SMACNA "Architectural Sheet Metal Manual, Fifth Edition." 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. All edge strips shall be neatly folded; external and internal corners shall be mitered and sealed in full bed of water cut off mastic for pre-finished metal. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.



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1. Fabricate in minimum 96-inch-long sections, but not exceeding 10-foot-long sections.
- B. Back-Up Plates: Where specified, set flashing ends in full bed of water cut-off mastic, allowing 1/4-inch between sections.
- C. Install flashing and sheet metal with concealed fasteners, unless indicated otherwise. Metal edge flashing shall be installed to resist wind blow-off and prevent flutter and vibration. Allow for expansion and contraction, making square, straight corners and tight overlaps, free of gaps and openings, properly sealed to be watertight.
- D. Electrolytic Action: Where two dissimilar metals adjoin or lap each other (example: galvanized metal ducts and copper cap flashing), an approved separating strip or other insulating material shall be installed.
- E. Bed flanges of work in water cut off mastic where required for waterproof performance.

### 3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

### 3.6 INSTALLER'S WARRANTY

- A. WHEREAS **<Insert name>** of **<Insert address>**, herein called the "Installer," has performed siding, roofing, flashing and associated work ("work") on the following project:
  1. Owner: **<Insert name of Owner.>**
  2. Address: **<Insert address.>**
  3. Building Name/Type: **<Insert information.>**
  4. Address: **<Insert address.>**
  5. Area of Work: **<Insert information.>**
  6. Acceptance Date: **<Insert date.>**
  7. Warranty Period: **<Insert time.>**
  8. Expiration Date: **<Insert date.>**
- B. AND WHEREAS Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

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- C. NOW THEREFORE Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. lightning;
    - b. peak gust wind speed exceeding 72 mph, formed flashing;
    - c. fire;
    - d. failure of siding and roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    - f. vapor condensation on bottom of work; and
    - g. activity on work by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
  2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
  3. Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
  4. During Warranty Period, if Owner allows alteration of work by anyone other than Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Installer to perform said alterations, Warranty shall not become null and void unless Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
  5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
  6. Owner shall promptly notify Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
  7. This Warranty is recognized to be the only warranty of Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of siding, roofing, flashing, or trim failure. Specifically, this Warranty shall not operate to relieve Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of

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whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

- E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.
1. Authorized Signature: <Insert signature.>
  2. Name: <Insert name.>
  3. Title: <Insert title.>

END OF SECTION 076200



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SECTION 078413 - THROUGH-PENETRATION FIRESTOP SYSTEMS

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. Penetrations in fire-resistance-rated walls.
  2. Penetrations in horizontal assemblies.
  3. Penetrations in smoke barriers.
  4. Compliance with requirements of UL assemblies indicated for fire-rated construction.
- B. Related Sections:
1. Division 07 Section "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction and in smoke barriers.
  2. Division 07 Section "Joint Sealants" for non-fire-resistive joint sealants.
  3. Division 09 Section "Gypsum Board Assemblies" for firestopping where fire rated gypsum board assemblies butt adjacent construction including masonry, steel deck, joists, beams, floors, roofs and structural members.
  4. Division 21, 22 and 23 Sections specifying duct and piping penetrations, including fire-suppression piping.
  5. Division 26 and 27 Sections specifying cable and conduit penetrations.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product proposed for use. Include product characteristics, typical uses, performance and limitation criteria, test data, and installation instructions.
- C. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition required.
1. Submit documentation, including illustrations applicable to each through-penetration firestop system configuration for construction and penetrating items.
  2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit 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.

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3. For those firestopping applications that exist for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgement derived from a similar UL system design or other tests shall be submitted to local authorities having jurisdiction for their review and approval prior to installation. Manufacturer's engineering judgement shall follow requirements set forth by the International Firestop Council.

D. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

E. Qualification Data: For qualified Installer.

F. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified, independent testing agency, for penetration firestopping.

#### 1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that required for this Project, 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 penetration firestopping 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. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
  - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
  - b. Classification markings on penetration firestopping correspond to designations listed by the following:
    - 1) UL in its "Fire Resistance Directory."
    - 2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
    - 3) FM Global in its "Building Materials Approval Guide."

D. Provide through-penetration firestop system products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

E. Preinstallation Conference: Conduct conference at Project site.

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1.5 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.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate Work of this Section with the work of other trades to assure the proper sequencing of each installation and to provide a fire- and smoke-resistant installation.
- B. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- C. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- D. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.
- E. 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bio Fireshield, Carlisle, MA.
  - 2. Grace Construction Products.
  - 3. Hilti, Inc.
  - 4. Specified Technologies Inc.

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5. 3M Fire Protection Products.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements required, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
1. Provide paintable penetration firestopping products at locations exposed to view in public spaces. Mechanical, electrical and elevator machine rooms are not considered public spaces.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.
  2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
  2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
  3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-wool-fiber or 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.



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3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide penetration firestopping systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule submitted. Fill materials are those 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.
  1. Product: CP 680 Cast-In-Place Firestop Device; Hilti Construction Chemicals, Inc.
- C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
  1. Products:
    - a. Biostop 500+ Intumescent Firestop; Bio Fireshield.
    - b. FlameSafe FS 900 Sealant; W. R. Grace & Co.
    - c. Fire Barrier CP 25WB+; 3M, Fire Protection Products Division.
    - d. SpecSeal LC 150 Sealant; Specified Technologies Inc.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
  1. Products:
    - a. Biostop Fire Rated Pipe Collar; Bio Fireshield.
    - b. FlameSafe FSWS Series FlameSafe Devices; W. R. Grace & Co.
    - c. CP 642 and CP 643 Firestop Jacket; Hilti Construction Chemicals, Inc.
    - d. SpecSeal Series LCC and Series SSC Firestop Collars; Specified Technologies Inc.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
  1. Products:
    - a. Biostop Composite Sheet; Bio Fireshield.
    - b. CS-195 Composite Sheet; 3M, Fire Protection Products Division.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
  1. Products:
    - a. FlameSafe FSP 1000 Putty and FSP 1077 Putty Pads; W. R. Grace & Co.
    - b. CP 617 Putty Pads and CP 618 Putty Sticks; Hilti Construction Chemicals, Inc.
    - c. Moldable Putty Stix MP+ and Moldable Putty Pads MPP+; 3M, Fire Protection Products Division.
    - d. Spec-Seal Firestop Putty Bars and Putty Pads; Specified Technologies Inc

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- G. Intumescent Wrap Strips with Foil: Single-component intumescent elastomeric sheets with aluminum foil on one side.
  - 1. Products:
    - a. CP 645 Wrap Strips; Hilti Construction Chemicals, Inc.
    - b. Fire Barrier FS-195+ Wrap Strip; 3M, Fire Protection Products Division.
- H. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets.
  - 1. Products:
    - a. Biostop Wrap Strip; Bio Fireshield.
    - b. SpecSeal Series SSWBLU and Series SSWRED Intumescent Wrap; Specified Technologies Inc.
- I. 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 nonshrinking, homogeneous mortar.
  - 1. Products:
    - a. FlameSafe Mortar Seal; W. R. Grace & Co.
    - b. CP 636 Firestop Mortar; Hilti Construction Chemicals, Inc.
    - c. SpecSeal Series SSM Firestop Mortar; Specified Technologies Inc.
- J. 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. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
  - 1. Products:
    - a. Bio Firestop Pillows; Bio Fireshield.
    - b. FlameSafe Bags and FlameSafe Pillows; W. R. Grace & Co.
    - c. CP 651 Firestop Cushion; Hilti Construction Chemicals, Inc.
    - d. SpecSeal Series SSB Firestop Pillows; Specified Technologies Inc.
- K. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
  - 1. Products:
    - a. CP 620 Firestop Foam; Hilti Construction Chemicals, Inc.
    - b. Fire Barrier 2001 Silicone RTV Foam; 3M, Fire Protection Products Division.
    - c. SpecSeal Pen 200 Silicone Foam; Specified Technologies Inc.
- L. 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.
    - a. Products:
      - 1) Biotherm 200SL Firestop Sealant; Bio Fireshield.
      - 2) CP 604 Self-Leveling Firestop Sealant; Hilti Construction Chemicals, Inc.
      - 3) Fire Barrier 1003SL; 3M, Fire Protection Products Division
  - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and sloped surfaces.

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- a. Products:
    - 1) Biotherm 100 Firestop Sealant; Bio Fireshield.
    - 2) CP 601S Elastomeric Firestop Sealant; Hilti Construction Chemicals, Inc.
  - M. Accessories: Forming/damming materials composed of mineral fiberboard or other type as recommended by through-penetration firestop systems manufacturer.
- 2.4 MIXING
- A. For those products requiring mixing before application, comply with penetration firestopping 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 required.

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

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with 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 penetration firestopping.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. 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 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 penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

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3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications required.
- B. Install forming 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 firestopping.
- C. Install fill materials for firestopping 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 the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing and inspecting agency, system number and date.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner may engage a qualified testing agency to perform tests and inspections.
- B. Allow for 3 random samples of each type of firestopping system to be inspected. Reinstall disturbed samples to comply with requirements.
- C. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

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- E. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping 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 penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413



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SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

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 fire-resistive joint systems for the following:
1. Floor-to-floor joints.
  2. Floor-to-wall joints.
  3. Head-of-wall joints.
  4. Wall-to-wall joints.
  5. Wall-to-adjacent structure and supports.
  6. Compliance with requirements of UL assemblies indicated for fire-rated construction.
- B. Related Sections include the following:
1. Division 07 Section "Through-Penetration Firestop Systems" for systems installed in openings in walls and floors with and without penetrating items.
  2. Division 07 Section "Joint Sealants" for non-fire-resistive joint sealants.
  3. Division 09 Section "Gypsum Board Assemblies" for firestopping where fire rated gypsum board assemblies butting adjacent construction including masonry, steel deck, joists, beams, floors, roofs and structural members.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint 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 assembly in which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, and with movement capabilities and L-ratings indicated as determined by UL 2079.
1. Load-bearing capabilities as determined by evaluation during the time of test.
  2. For fire-resistance systems with movement capabilities, allow for the following movement.
    - a. Floors: 3/4-inch deflection.
    - b. Roofs: 1-inch deflection.
  3. Provide systems with L-rating where walls and partitions also are smoke barriers. Where a fire-resistive joint system is not available with the ability to resist smoke, provide smoke sealant material to one side of wall to stop the passage of smoke.

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- C. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with as determined by NFPA 285 and UL 2079.
  - 1. UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one side of joint.
- D. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
  - 1. For fire-resistive joint systems exposed to view in public spaces upon completion of Work, provide products that are paintable.
    - a. Mechanical, electrical and elevator machine rooms are not considered public spaces.

#### 1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product proposed for use. List product characteristics, typical uses, performance and limitation criteria, test data, and installation instructions.
- C. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
  - 2. For those fire-resistive joint system applications that exist for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from a similar UL system design or other tests shall be submitted to local authorities having jurisdiction for their review and approval prior to installation. Manufacturer's engineering judgment shall follow requirements set forth by the International Firestop Council.
- D. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.
- E. Qualification Data: For Installer.
- F. Field quality-control test reports.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that required for this Project, 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 fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.



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- 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 fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
  - 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, OPL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
  - 2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:
    - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
    - b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. Remove and replace materials, at no cost to Owner, that cannot be applied within their stated shelf life.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

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- C. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector or authorities having jurisdiction have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide products by one of the following:
  1. A/D Fire Protection Systems Inc.
  2. W.R. Grace & Co., Construction Products Division.
  3. Hilti Construction Chemicals, Inc.
  4. Johns Manville International, Inc.
  5. Nelson Firestop Products
  6. NUCO Inc.
  7. RectorSeal Corporation (The)
  8. Specified Technologies Inc.
  9. 3M Fire Protection Products
  10. Tremco Sealant/Weatherproofing Division
  11. United States Gypsum Company.

2.2 FIRE-RESISTIVE JOINT SYSTEMS

- A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems submitted.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

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1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
  2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. 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 fire-resistive joint 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 fill materials of fire-resistive joint system 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 of fire-resistive joint system materials from adjoining surfaces. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

### 3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications used.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in 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 fire-resistive joint system.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
  2. Apply fill materials so they contact and adhere to substrates formed by joints.
  3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
  2. Contractor's name, address, and phone number.
  3. Designation of applicable testing agency.
  4. Date of installation.

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5. Manufacturer's name.
6. Installer's name.

B. Do not install identification on exposed finished wall locations.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.
- B. Before installation of ceilings, walls, and adjacent construction that would conceal fire-resistive joint systems, inspect joints to verify complete installation of fire-resistive joint systems materials.
- C. Remove and replace fire-resistive joint 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.
- E. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.6 CLEANING AND PROTECTING

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

END OF SECTION 078446

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SECTION 079200 - JOINT SEALANTS

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 joint sealants for the following applications, including those specified by reference to this Section:
1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Construction and control joints in cast-in-place concrete.
    - b. Perimeter joints between PVC trim and adjacent materials.
    - c. Other joints as indicated.
  2. Exterior joints in the following horizontal traffic surfaces:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Other joints as indicated.
  3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
    - d. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - e. Other joints as indicated.
  4. Interior joints in the following horizontal traffic surfaces:
    - a. Isolation and control joints in exposed cast-in-place concrete slabs.
    - b. Other joints as indicated.
- B. Related Sections include the following:
1. Division 06 Section "Finish Carpentry" for sealing joints related to exterior PVC trim.
  2. Division 07 Section "Sheet Metal Flashing and Trim" for sealing joints related to flashing and sheet metal for roofing.
  3. Division 07 Section "Through-Penetration Firestop Systems" for sealing joints in fire-resistance-rated construction.
  4. Division 07 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
  5. Division 08 Section "Glazing" for glazing sealants.
  6. Division 09 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce smoke and sound transmission and for fire-rated sealants in conjunction with fire-rated gypsum assemblies.
  7. Divisions 21, 22, 23, and 26 for sealing of perimeter joints of plumbing, HVAC systems, automatic fire protection systems, telecommunication systems, and electrical systems.
  8. Division 32 Sections for sealing joints in pavements, walkways, and curbing.

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1.3 PERFORMANCE REQUIREMENTS

- A. Provide joint sealants that have been produced and installed to establish and maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittals Procedures."
- B. Product Data: For each joint-sealant product indicated.
  - 1. Include manufacturer's installation instructions.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint design, including width and depth of joint sealant, and backer rod or bond-breaker size and location.
  - 3. Joint-sealant manufacturer and product name.
  - 4. Joint-sealant formulation.
  - 5. Joint-sealant color.
  - 6. Primer for each substrate type.
  - 7. Solvent wipe cleaner for each substrate type.
- D. Samples for Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in materials, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

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, shelf/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.
- C. Remove and replace materials, at no cost to Owner, that cannot be applied within their stated shelf life.

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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 limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
- 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.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation to ensure a weathertight installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Exposed Joint Sealants: Products exposed to view in public areas shall be paintable. Mechanical, electrical and elevator machine rooms are not considered public spaces.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 JOINT SEALANTS

- A. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Type S, Grade NS, Class 25; single component.
  - 1. Sonolastic NP-1; Sonneborn, Division of ChemRex Inc.
  - 2. Dymonic; Tremco.
  - 3. Sikaflex-1a; Sika Corporation, Inc.
  - 4. Dynatrol 1; Pecora Corporation.
  - 5. Vulkem 921; Tremco.

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6. Chem-Calk 900; Bostik Findley.
- B. Type 2 - Exterior Trim and Siding Sealant: Single component, elastomeric sealant; ASTM C 920; Type S, Grade NS, Class 25, Use NT, M, G and A; as applicable to joint substrates indicated. Provide sealant to match prefinished products. Sealant shall be paintable for use with field-finished products.
1. Products for Color Matched Sealants:
    - a. OSI Sealants, Inc.; Quad Advanced Formula Sealant for Windows, Doors & Siding.
    - b. Franklin International; Titebond Weathermaster Sealant for Siding, Windows and Doors.
    - c. Geocel Corporation; ProColor SWD Triopolymer Sealant.
  2. Colors: As selected by Architect to match adjacent material.
- C. Type 3 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
1. Tremflex 834; Tremco.
  2. AC-20; Pecora Corporation.
  3. Chem-Calk 600; Bostik Findley.
- D. Type 4 - Plumbing Fixture/Tile Sealant: Silicone; ASTM C920, Uses M and A; single component, mildew resistant, color selected by Architect.
1. 898 Silicone; Pecora Corporation.
  2. Trensil 200; Tremco, Inc.
- E. Type 5 - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
1. Sonolastic SL-1; Sonneborn, Division of ChemRex Inc.
  2. Tremflex S/L; Tremco.
  3. Sikaflex-1CSL; Sika Corporation, Inc.
  4. NR-201; Pecora Corporation.
  5. Vulkem 45; Tremco.
  6. Chem-Calk 950; Bostik Findley.
- F. Acoustical Sealant: Specified in Division 09 Section "Gypsum Board Assemblies."

#### 2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings (backer rods) of material and type that are nonstaining; 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 (Backer Rod): ASTM C 1330, Type C, preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding 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:
1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.



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- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

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 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 joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions 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 after cleaning operations above 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 recommended in writing by joint-sealant manufacturer, based on prior experience. Apply primer to comply with joint-sealant

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manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

1. Masonry, concrete, and precast concrete surfaces shall be primed.

- 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 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Installation of Sealant Backings (Backer Rods): Install sealant backings to comply with the following requirements:
1. Install sealant backings of type indicated to provide support of sealants during application and at position required to produce 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 sealant backings.
    - b. Do not stretch, twist, puncture, or tear sealant backings.
    - c. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
  2. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and joint fillers or backs of joints.
- D. Installation of Sealants: Install sealants using 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 and primers are installed.
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

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3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants 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 installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joints between Exterior Metal Frames, Windows, Trim and Adjacent Work : Type 2; colors as selected.
- B. Under Exterior Door Thresholds: Type 1.
- C. Exterior Joints for Which No Other Sealant Type is Indicated: Type 2; colors as selected.
- D. Concealed Interior Perimeter Joints of Exterior Openings: Type 1.
- E. Exposed Interior Perimeter Joints of Exterior Openings: Type 3; colors as selected.
- F. Control and Expansion Joints in Interior Concrete Slabs and Floors Left Exposed: Type 5; colors as selected.
- G. Joints between Plumbing Fixtures and Walls and Floors and Between Countertops and Walls: Type 4; colors as selected.
- H. Interior Joints for Which No Other Sealant is Indicated: Type 3; colors as selected.

END OF SECTION 079200



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SECTION 081113 - 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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Hollow metal doors and frames.
- B. Related Sections:
  - 1. Division 07 Section "Building Insulation" for insulation in hollow metal door frames in exterior steel stud walls.
  - 2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
  - 3. Division 09 Sections "Painting" for field painting hollow metal doors and frames.
  - 4. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
  - 1. Submittals for Division 08 Sections "Hollow Metal Doors and Frames," "Wood Doors," and "Door Hardware" shall be made concurrently.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.
- C. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Provide dimensions for proper edge clearances of wood and metal doors, including meeting stiles for pairs of doors going into metal frames.
  - 5. Locations of reinforcement and preparations for hardware.
  - 6. Details of each different wall opening condition.
  - 7. Details of anchorages, joints, field splices, and connections.

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- 8. Details of accessories.
- 9. Details of conduit and preparations for power, signal, and control systems.

- D. Door Schedule: Provide a schedule of hollow metal doors and frames prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.
- F. Certificate: Provide certification that primed non-galvanized steel doors comply with ANSI A250.10 acceptance criteria and primer has a uniform dry film thickness of not less than 0.7 mils.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations for Hollow Metal Doors and Frames: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C (Positive pressure).
- C. Door Frame Inspection: Contractor with Installer shall inspect each door frame, checking frame for squareness, alignment, twist, and plumbness before installation of wallboard and masonry to assure proper fit of doors with correct clearances and operation without modification to the door. Frames that are out of tolerance shall be reinstalled to requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Inspect doors and frames on delivery for damage; notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.
- D. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

#### 1.7 PROJECT CONDITIONS

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

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1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate dimensions for proper edge clearances of wood and metal doors, including meeting stiles for pairs of doors going into metal frames.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Door and Frame Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ceco Door Products; an Assa Abloy Group company.
  - 2. Curries Company; an Assa Abloy Group company.
  - 3. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- G. Grout: Comply with Division 04 Section "Unit Masonry Assemblies."
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

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2.3 HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8, unless more stringent requirements are specified.
1. Design: Flush panel.
  2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core. Provide internal sound deadener on inside of face sheets.
    - a. Fire Door Core: As required to provide fire-protection ratings indicated.
    - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 11.1 deg F x h x sq. ft./Btu when tested according to ASTM C 518, unless otherwise indicated.
      - 1) Locations: Exterior doors.
  3. Vertical Edges for Doors: Beveled edge.
    - a. Beveled Edge: 1/8 inch in 2 inches.
  4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
  5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), 16 Gage, Model 2 (Seamless).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), 18 gage, Model 2 (Seamless).
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates of sufficient strength from same material as door face sheets to support hardware without through bolting and to comply with the following minimum sizes:
1. Hinges: Minimum 0.123 inch thick, 10 gage, by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick, 8 gage.
  3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick, 8 gage.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.



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- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
  - 1. Fabricate frames with mitered or coped corners and seamless face joints.
  - 2. Fabricate frames as full profile welded, unless otherwise indicated.
  - 3. Frames for Level 3 Steel Doors: 0.053-inch- thick, 16 gage, steel sheet.
  
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
  - 1. Frames for Pairs of Doors: Fabricate frames as face welded with mitered or coped corners and seamless face joints.
  - 2. Fabricate knocked-down frames with mitered or coped corners, for field assembly, except as otherwise indicated. Pressure fit frames not allowed.
  - 3. Provide frame with kerf and smoke seals at smoke doors and fire rated doors.
  - 4. Frames for Level 2 Steel Doors: 0.053-inch- thick, 16 gage, steel sheet.
    - a. Frame for Fire Rated Door 177B: 0.067-inch- thick, 14 gage, steel sheet.
  - 5. Frames for Wood Doors: 0.053-inch- thick, 16 gage, steel sheet.
  - 6. All welded joints shall be ground and dressed to be smooth, flush, and invisible.
  
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates of sufficient strength from same material as frames to support hardware without through bolting and to comply with the following minimum sizes:
  - 1. Hinges: Minimum 0.123 inch thick, 10 gage, by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  - 2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick, 14 gage.
  - 3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick, 14 gage.
  - 4. Fabricate concealed stiffeners and hardware reinforcement plates from same material as frames.
  - 5. Locate hardware reinforcement plates as indicated on Shop Drawings or, if not indicated, according to ANSI/SDI A250.6.
  
- E. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick, 28 gage, steel sheet to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

## 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: T-shaped anchors to suit frame size, not less than 0.042 inch thick, 18 gage.
  - 2. Stud-Wall Type: Slip in wood stud anchor; not less than 0.053 inch thick, 16 gage.
  - 3. Compression Type: Not permitted..
  
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, 18 gage, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

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2.6 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.
- B. Smoke Seals for Smoke Door Frames and Fire-Rated Door Frames: Provided in Division 08 Section "Door Hardware."
- C. Weather Stripping for Exterior Door Frames: Provided in Division 08 Section "Door Hardware."

2.7 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: For exterior locations and elsewhere as indicated, fabricate doors from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- thick, 16 gage, metallic-coated steel channels with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.
  - 2. Interior Door Faces: Fabricate exposed faces of doors, including stiles and rails of nonflush units, from cold-rolled steel sheet, unless otherwise indicated.
  - 3. Pairs of Doors: Size pairs of doors to provide the following maximum gap between leaves to permit proper functioning of dead latching feature:
    - a. Rated Doors: Maximum 1/8-inch gap.
    - b. Non-Rated Doors: Maximum 3/16-inch gap.
  - 4. Glazed Lites: Factory cut openings in doors.
  - 5. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
  - 6. Coordinate door undercut to provide 1/2 inch clearance from top of floor covering. Coordinate locations where tile floor coverings occur.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

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4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor. Provide floor anchors for all frames. Floor anchors are in addition to jamb anchors.
  5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      - 5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
  6. Door Silencers: Except on weather-stripped doors and doors with smoke seals, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
  7. Provide welded frames with temporary spreader bars for shipping. Shipping spreader bars to be removed before installation, with template jig used to properly square up and space jambs.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated on Shop Drawings, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware. Through bolting will not be acceptable.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
    - a. Door 117A: Prep door and frame for 5 hinges.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- G. Astragals: As required by NFPA 80 to provide fire ratings indicated.

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2.8 STEEL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Apply primers to hollow metal doors and frames after assembly.
  - 2. All interior and exterior doors and frames shall be factory primed to assure proper preparation and bond of primer. Bare galvanized or galvanized steel for field priming not permitted.
- B. Comply with SSPC-PA1, "Paint Application Specification No. 1," for steel sheet finishes.
- C. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. 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 regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. If unacceptable conditions are encountered, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 PREPARATION

- A. Review finish schedules and verify flooring thickness to permit frame to be set at proper elevation to maintain undercut clearance of factory fit wood and hollow metal doors, providing not less than 1/4 inch clearance from finish floor.
- B. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- C. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
  - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- D. Paint backside of frames to be set in masonry with bituminous coating.
- E. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
- F. Hollow metal door frames installed in exterior steel stud framed walls shall be filled with rigid insulation before installing. Coordinate preparation and installation of insulation with requirements of Division 07 Section "Building Insulation."

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames for doors and other openings, of size and profile indicated. Comply with ANSI/SDI A250.11.
  - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Install door silencers in frames before grouting.
    - c. Remove shipping straps at bottom of frames. Properly space frame using wood template that is full depth of frame and of proper spacing width during setting and anchoring of frames to maintain proper width, with frame plumb and square without twists. Remove temporary braces necessary for installation only after frames have been properly set and secured. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

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- d. Set bottom of frames at required elevations to provide proper undercut clearance of factory fit doors.
  - e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - f. Field apply bituminous coating to backs of frames that are filled with grout.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors. Floor anchors are in addition to wall anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Stud Partitions: Attach wall anchors to studs with screws. Provide floor anchor at each jamb, in addition to the wall anchors. Use galvanized or stainless steel fasteners at exterior locations.
  4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.
  4. Pairs of Doors: Install pairs of doors to provide the following maximum gap between leafs and accurate alignment of strike to permit proper functioning of dead latching feature:
    - a. Rated Doors: Maximum 1/8-inch gap.
    - b. Non-Rated Doors: Maximum 3/16-inch gap.
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
  - B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

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

END OF SECTION 081113





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SECTION 081416 - 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. Section Includes:

1. Solid-core doors with MDO faces.
2. Solid-core doors with embossed hardboard faces.
3. Shop priming wood doors.
4. Factory fitting wood doors to frames and factory machining for hardware.
5. Factory glazing of wood doors with glazed openings.

B. Related Requirements:

1. Division 08 Section "Hollow Metal Doors and Frames" for hollow metal frames receiving wood doors.
2. Division 08 Section "Door Hardware" for hardware and templates, and door hardware preinstallation conference.
3. Division 09 Section "Painting" for field finishing of wood doors.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to door installation including, but not limited to, the following:

1. Meet with Owner, Architect, door installer, hardware installer, door supplier and door manufacturer's representative. Provide 7 business days minimum advance notice to participants prior to convening preinstallation conference. Door preinstallation conference shall run concurrently with door hardware preinstallation conference.
2. Review methods and procedures related to door installation, including manufacturer's written instructions.
3. Review installation of fire doors, including hinge screw application to fire rated doors and requirements for door removal from frame if required after installation.
4. Review door swing and closer installation to permit maximum swing without binding at frame opening.
5. Review floor covering requirements to provide proper door undercut clearance.
6. Review fire rated door requirements regarding no field modifications to labeled doors.
7. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

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1.4 ACTION SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
  - 1. Submittals for Division 08 Sections "Hollow Metal Doors and Frames," "Wood Doors," and "Door Hardware" shall be made concurrently.
- B. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- C. Shop Drawings: Indicate location, size, thickness, and hand of each door; elevation of each kind of door; type of glass where required; and construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
    - a. Verify ceramic tile locations for proper clearance of door bottoms and hardware.
  - 5. Fire-protection ratings for fire-rated doors.
  - 6. Fire-protection ratings for fire-rated glazing.
- D. Door Schedule: Submit schedule of doors using same reference numbers for details and openings as those on Contract Drawings.
  - 1. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- E. Samples:
  - 1. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
  - 2. Louver blade and frame sections, 6 inches long, for each material and finish specified.
  - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.
- F. Preinstallation conference meeting notes.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Protect wood doors during transit, storage, and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standard, manufacturer's instructions, and recommendations of WDMA I.S.1, Appendix, "How to Store, Handle, Finish, Install and Maintain Wood Doors."
  - 1. Package doors at factory prior to shipping.
  - 2. Protect doors from extremes of heat and cold. Relative humidity shall not be less than 30 percent nor more than 60 percent.
  - 3. Compare prefinished doors to approved finish sample upon delivery. Notify Architect if sample does not match.

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- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: 5 years.
  - 4. Warranty Period for Embossed Solid-Core Interior Doors: 5 years.
  - 5. Warranty Period for Embossed Solid-Core Unit Entry Doors: Limited lifetime.

PART 2 - PRODUCTS

2.1 WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
- B. WDMA I.S.1-A Performance Grade: Heavy Duty.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C (positive pressure), Category A.
  - 1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  - 2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
  - 3. Acceptable Fire-Rating Label: Underwriters' Laboratories, Inc. (UL) or Warnock Hersey.
- D. Smoke-Control Door Assemblies: Listed and labeled for smoke control, based on testing according to UL 1784.
- E. Particleboard-Core Doors:
  - 1. Particleboard: ANSI A208.1, Grade LD-2.

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2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
  - a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges. Comply with specified requirements for concealed intumescent seals for fire-rated wood doors.
  - a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

2.2 DOORS FOR OPAQUE FINISH

A. Flush Interior Solid-Core Doors, Rated:

1. Grade: Custom.
2. Faces: MDO.
3. Exposed Vertical Edges: Any closed-grain hardwood.
4. Core: Mineral core.
5. Construction: Three plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
6. WDMA I.S.1-A Performance Grade: Heavy Duty.
7. Product: Mohawk Flush Doors; Commercial Series.

B. Embossed Interior Solid-Core Doors:

1. Grade: Custom.
2. Faces: Molded hardboard.
3. Exposed Vertical Edges: Any closed-grain hardwood.
4. Core: Particleboard.
5. WDMA I.S.1-A Performance Grade: Heavy Duty.
6. Product: Mohawk Flush Doors; Commercial Series, Two Panel Roman.

C. Embossed Interior Solid-Core Unit Entry Doors:

1. Door Construction: Provide 1/2-inch premium grade MDF faces over 3/4-inch EPS foam core with wood stiles on each vertical precision routed into and sandwiched between the MDF faces; route face plies to designated configuration; use moisture resistant Type 1 adhesive.
2. Smoke Control Door: Doors shall comply with UL 1784; attach smoke label to door.
3. Product: DoorMerica Products; Millennium Collection, Encore Series, Profile No. 6202.

2.3 LIGHT FRAMES

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard noncombustible beads approved for use in doors of fire-protection rating indicated. Include

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concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.4 GLAZING IN DOORS

- A. Safety Glass (Fully Tempered): ASTM C 1048; Kind FT (fully tempered), Condition A (uncoated), Type I (transparent flat glass); Class 1(clear); Quality q3 (glazing select); conforming to ANZI A97.1.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with NFPA 80 requirements for fire-rated doors.
  - 2. Coordinate sizing of pairs of doors to provide the following maximum gap between leafs to permit proper functioning of dead latching feature:
    - a. Rated Doors: Maximum 1/8-inch gap.
    - b. Non-Rated Doors: Maximum 3/16-inch gap.
- 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, BHMA-156.115-W, and hardware templates.
  - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable installation requirements in Division 08 Section "Glazing."

2.6 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of manufacturer's standard wood primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed 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."

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1. Hinges shall be shimmed with metal shims at each door to provide equal clearance at each jamb.
    - a. After hinges have been fastened to fire rated doors, do not permit removal and reinstallation of screws to fire rated door edge material.
  2. Locks, exit devices, door closers and other hardware shall be installed in accordance with the manufacturer's instructions. Pilot holes of recommended size, for wood screws required to fasten hardware, shall be drilled by installing Contractor before screws are fastened to wood doors.
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
1. Install fire-rated doors according to NFPA 80.
  2. Install smoke-control doors according to NFPA 105.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge. Coordinate pairs of doors to provide the following maximum gap between leafs and accurate alignment of strike to permit proper functioning of dead latching feature:
1. Rated Doors: Maximum 1/8-inch gap.
  2. Non-Rated Doors: Maximum 3/16-inch gap.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- 3.3 ADJUSTING
- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that 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 081416

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SECTION 085200 - CLAD WOOD 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. Section includes vinyl clad windows with factory finished interior. Provide the following types:
1. Awning windows.
  2. Awning picture windows.
  3. Glazing.
  4. Accessories.
- B. Related Sections include the following:
1. Division 06 Section "Finish Carpentry" for PVC exterior trim.
  2. Division 07 Section "Modified Bituminous Sheet Air Barriers" for provision of flashing tape to seal perimeter of window flanges to air barriers.
  3. Division 07 Section "Joint Sealants" for sealants at perimeter of windows.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide products/systems that have been manufactured, fabricated, and installed to the following performance criteria:
1. Comply with ANSI/AAMA/NWWDA 101/I.S.2.
  2. Performance Grade: Minimum of DP 50.
  3. U-Factor (NFRC 100): Awnings 0.28; Awning Picture 0.27.
  4. Solar Heat Gain Coefficient (SHGC) (NFRC 200): Awnings 0.29; Awning Picture 0.34.
- B. Structural Requirements: Provide products/systems capable of withstanding wind loads based on testing units representative of those indicated for Project that pass AAMA/NWWDA 101/I.S.2/NAFS, Uniform Structural Load Test:
1. Design Wind Loads: Determine design wind loads applicable to Product from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 meters) above grade, according to ASCE, Section 6, based upon mean roof heights indicated on Drawings.
    - a. Basic Wind Speed: 100 MPH.
    - b. Importance Factor: 1.00
    - c. Exposure Category: C.
    - d. Wind Load Requirement: 38PSF.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures".

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- B. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, accessories, finishes, and operating.
  - 1. Include product data for minimal-expanding foam insulation.
- C. Shop Drawings: Provide drawings indicating direction of operable parts, typical jamb, head and sill conditions, and special mullion reinforcement details.
  - 1. Mullion details, including reinforcement and stiffeners.
  - 2. Flashing and drainage details.
  - 3. Rough opening requirements for installation of windows. Allow 1/4-inch minimum around perimeter of window to receive minimal expanding foam.
- D. Window Attachment Requirements: Submit manufacturer's window fastener, clip and spacing requirements for attachment of window into rough opening for project wind loads.
- E. Color Samples: Submit selection and verification samples, including the following:
  - 1. Hardware: Submit Sample indicating typical finish on hardware.
  - 2. Cladding: Submit color samples of exterior cladding.
- F. Quality Assurance/Control Submittals: Submit the following:
  - 1. Performance Data: Provide manufacturer's published performance data for specified products.
- G. Contract Closeout Submittals: Submit the following:
  - 1. Warranty documents specified herein.
  - 2. Owner's Manual: Bound manual clearly identified with project name, location, and completion date. Identify type and size of units installed. Provide recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary repair.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.
- B. Certifications:
  - 1. Insulating Glass Units: Provide insulating glass units permanently marked with certification label of Insulating Glass Certification Council (IGCC) indicating compliance with ASTM E2190.
- C. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to wood windows including, but not limited to, the following:
  - 1. Meet with Owner, Architect, window manufacturer representative, Installer, and installers whose work interfaces with or affects windows and trim, including installers of air barrier waterproofing system and sun control devices.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.



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3. Review, discuss, and coordinate the interrelationship of windows with other exterior wall components. Include provisions for structural anchoring, flashing, tying into air barrier waterproofing system, weeping, sealing perimeters, and protecting finishes.
  - a. Discuss window manufacturer's requirements for applying flashing tape to window flange to tie into air barrier waterproofing system.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.
6. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
7. Provide 7 business days minimum advance notice to participants prior to convening preinstallation conference.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 01 Product Requirements Section.
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- E. Store materials and accessories off ground, under cover, and protected from weather and construction activities.

1.7 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard limited warranty document. Manufacturer's limited warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
  1. Warranty Period:
    - a. Window: 10 years from date of Substantial Completion.
    - b. Glazing Units: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Product: Andersen Windows, Inc.; 400 Series Awning Windows and 400 Series Awning Picture Windows

2.2 MATERIALS

- A. Frame and Sash: Fabricated from wood species approved in WDMA Industry Standard I.S.2.

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- B. Vinyl Cladding: Rigid vinyl (PVC) complying with requirements of ASTM D4216, in the following color:
  - 1. Color: White.
- C. Weather Stripping:
  - 1. Venting Sash: Weather stripped with the following material:
    - a. Tubular flexible vinyl.
    - b. Flexible EPDM foam.
  - 2. Stationary Awning Sash: Weather stripped with foamed PVC gaskets or tubular flexible vinyl.
- D. Interior Stops:
  - 1. Vinyl wrapped wood.

### 2.3 GLAZING

- A. General: Insulating glass units certified through the Insulating Glass Certification Council as conforming to the requirements of IGCC. Provide dual sealed units consisting of polyisobutylene primary seal and silicone secondary seal. Provide metal spacers with bent or soldered corners.
- B. High-Performance Low-E4 Glass Argon Blend Filled Insulating Glass Units:
  - 1. Glass – Operating Units: Insulating glass units consisting of an outboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3 and an inboard lite of clear, heat strengthened glass conforming to ASTM C1048, Type 1, Class 1, q3, Kind HS.
  - 2. Glass - Fixed Units: Insulating glass units consisting of an outboard and inboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3.
  - 3. Magnetron sputtering vapor deposition (MSVD) TiO<sub>2</sub> coating applied to the No. 1 surface.
  - 4. High-Performance Low-E4 Coating: Magnetron sputtering vapor deposition (MSVD) Low-E coating applied to the No. 2 surface.
  - 5. Filling: Fill space between glass lites with argon gas blend.
  - 6. Protective removable polyolefin film applied to glass surfaces No. 1 and No. 4.
  - 7. Where indicated, provide obscure frosted glass.

### 2.4 HARDWARE

- A. Venting Casement Hardware:
  - 1. Hardened steel operator arm stamped with a gear ring. Set arm gear between nylon bushing and nylon spacer. Encase drive shaft and worm gear assemblies in zinc die cast base and removable polycarbonate cover.
  - 2. Hinges: Stainless steel and heavy gauge steel arms. Stainless steel reinforcing insert in low friction shoe for rectangle units. 2-knuckle stainless steel butt hinges for shaped units. Apply hinges to venting sash indicated on Drawings.
  - 3. Operator Handle and Covers:
    - a. Folding Handle: Zinc die cast handle with powder coated painted finish and polycarbonate operator cover with integral color in the following style and finish.
    - b. Style Contemporary.

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- c. Color: White
  - 4. Sash Locks: Single actuation lock concealed by trim stops. Die cast zinc, galvanized steel link and engineered polymer components.
  - 5. Limited Ventilation Control Adapters: Stainless steel limited ventilation control adapters designed to limit casement opening and projection. Adapters to work with the existing hinge hardware.
  - 6. Corrosion Resistant Hardware:
    - a. Hinges: 304 stainless steel arms and track; 302 stainless steel rivets and screws; and 301 stainless steel shoe insert.
    - b. Operators: 304 stainless steel gear arm link and clip; 302 stainless steel gear arm rivet; zinc plated steel bottom plate. Other parts plated and powder coated steel or zinc.
- B. Awning Hardware:
- 1. Operator: Rotary-type operator attached to plated steel rod applied to bottom rail of sash. Single steel operator arm stamped with gear ring. Set arm gear assembly between nylon bushing and nylon spacer. Encase drive shaft and worm gear assembly in zinc die cast base.
  - 2. Operator Handle and Covers:
    - a. Folding Handle: zinc die cast folding handle with powder coated painted finish and polycarbonate operator cover with integral color in the following style and finish.
      - 1) Style Contemporary
      - 2) Color: White.
  - 3. Sash Locks: Single actuation lock concealed by trim stops. Die cast zinc, galvanized steel link and engineered polymer components in finishes to match handle options.
  - 4. Hinges: Stainless steel hinges with brass shoe that has nylon block for screw adjustment of friction.
  - 5. Corrosion Resistant Hardware:
    - a. Hinges: 316 stainless steel arms, rivets, track, screws and shoe insert.
    - b. Operators: 302 stainless steel gear arm rivet; zinc plated steel bottom plate. Other parts plated and powder coated steel or zinc.

## 2.5 JOINING SYSTEMS

- A. Wood Non-Reinforced Joining:
  - 1. Non-reinforced join with wood spacer.
  - 2. Gusset Plates: Galvanized metal gusset plates.
- B. Aluminum Reinforced Joining.
  - 1. Reinforcing: Extruded aluminum profile of 6061-T6 aluminum with pre-drilled holes.
  - 2. End Plate: 0.080 inch (2.03 mm) 6061 T-5 stamped aluminum end plate with yellow chromate conversion coating and 1/2 inch (12.7 mm) stud that engages into aluminum profile.
  - 3. Jamb Clips: Stainless steel jamb clips.
- C. Fasteners: Corrosion resistant screws and bolts as provided by window manufacturer for fastening reinforcement members to wood frame and fastening end brackets to reinforcement members. Other fasteners provided by window installer.

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- D. Provide silicone sealant recommended by window manufacturer.
- E. Provide vinyl trim strips as recommended by window manufacturer for each joining method used.
  - 1. Color: Match window unit exterior color.
- F. Provide Head Flashing: 6 inch (152 mm) long sheet vinyl.
  - 1. Color: Match window unit exterior color.
- G. Jamb clips: Stainless steel.
- H. Inside Mull Casing: Provide mull casings in the following species.
  - 1. Casing Species: Prefinished White.

## 2.6 ACCESSORIES

- A. Insect Screens: Provide venting sash with an insect screen, including attachment hardware.
  - 1. Frames: 0.024 inch (0.61 mm) rolled aluminum frame with chromate conversion coating. Provide matching corner locks and latch retainers.
    - a. Insect Screen Cloth: 18 by 16 aluminum mesh, gunmetal finish.
    - b. Frame Finish: High-bake polyester finish; white.
- B. Grilles:
  - 1. Finelight Grilles: Provide contour profile aluminum muntin bars permanently mounted within insulating glass unit where indicated on Drawings.
    - a. Grille Intersections: ABS concealed plastic connectors with nylon end keepers.
    - b. Exterior and Interior Surface: White painted finish.
    - c. Width: 3/4 inch (19.1 mm).
    - d. Pattern as indicated on Drawings.
- C. Drywall Return Bead: Provide trim around interior perimeter of window frame, providing smooth face to butt against drywall returns.
  - 1. White painted wood.
- D. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.

## 2.7 INSTALLATION MATERIALS

- A. Polyurethane Foam Sealant (Minimal Expansive): Single- or two-component, UL classified sealant, to insulate, seal, fill, and stop air infiltration; shall not expand to the point to cause pressure on window jambs.
  - 1. Density: 1.2 lbs./cu. ft.
  - 2. R-Value: Not less than 4.0 per inch of thickness.
  - 3. Fire-Test-Response Characteristics: ASTM E 84, as follows:
    - a. Flame Spread: 25.
    - b. Smoke Developed: 50.

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4. Manufacturers:
    - a. Dow Chemical Company (The); Great Stuff PRO Window & Door.
    - b. Fomo Products Inc.; Handi-Seal Window and Door Sealant.
  5. Convenience Products; No-Warp Foam Window & Door Insulating Sealant
- B. Fiberglass Insulation: Unfaced glass fiber insulation, ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Silicone Sealant: Single component, nonstaining, nonsagging sealant for exterior exposure as recommended by window manufacturer for use with window.
- D. Installation Fasteners: Non-corrosive and compatible with treated wood blocking, of type and size required by window manufacturer for compliance with wind load requirements.

## 2.8 FABRICATION

- A. Preservative Treatment: Treat wood frame members after machining with a water repellent preservative in accordance with WDMA I.S.4.
- B. Vinyl Cladding:
  1. Sash Members: Completely encase sash members with seamless, 0.047 inch (1.19 mm) thick, rigid vinyl extrusions. Heat-weld corners.
  2. Frame Units: Clad frame units with preformed rigid vinyl to provide joint-free cover. Provide integral flanges of 0.040 inch (1.02 mm) vinyl. Bond sheathing to wood frame with vinyl-to-wood adhesive.
- C. Glazing: Factory glaze with high quality glazing sealant and snap-in rigid vinyl glazing bead.
- D. Factory-apply weatherstripping.
- E. Complete fabrication, assembly, reinforcement and mulling of units, mullion cover, prefinished white window interior, hardware application, and other work in the factory to maximum extent possible. Disassemble components only as necessary for shipment and installation.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the window manufacturer.

### 3.2 EXAMINATION

- A. Site Verification of Conditions: Verify that site conditions are acceptable for installation of units, including the following:
  1. Rough openings are square and dimensions are correct.
  2. Sill plates are level.
  3. Air barrier is clean and dry.

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- B. Do not proceed with installation of units until unacceptable conditions are corrected.

### 3.3 INSTALLATION

#### A. General:

1. Remove unit components, parts, accessories, and installation guides from carton.
2. Inspect unit components and verify that components are not damaged and that parts are included before disposing of carton.
3. Shop-assemble multiple units that could not be factory assembled due to size and reinforcing requirements before installation in accordance with manufacturer's installation guides.

#### B. Interface With Other Work:

1. Perform installation in accordance with Manufacturer's instructions.
2. Apply a continuous 1/4-inch bead of caulking to back of window nailing fin or trim nailing fin just inside row of fastening holes along the head and jambs. At window sill, apply a 1/4-inch bead of caulking to back of window nailing fin or trim nailing fin just inside row of fastening holes, applied in a stitch pattern that provides 2 inch wide skips near the corners and intermittently along the run of the sill to provide sill flashing drainage weeps. Do not allow sealant to come out onto face of weather barrier or face of nail fin. Exposed sealant prevents proper adhesion of perimeter flashing tapes and transition membranes.
3. Install units level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
  - a. Maintain alignment with adjacent work.
  - b. Secure assembly to framed openings without distortion, to comply with specified design pressure.
  - c. Center window in opening to provide uniform spacing around interior perimeter to receive sealant, resting bottom on sill plate.
  - d. If window is of size to require field mulling, seal between units and apply mullion covers to be air and water tight.
4. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
5. Touch up factory finished interior units per window manufacturer requirements.

#### C. Perimeter Insulation:

1. Insulate the cavity between window frame and rough opening, with fiberglass insulation lightly stuffed from back side of trim/nailing fin, to within 1-inch of the interior face of window frame. Insulate between window frame and rough opening of the remaining void depth of approximately 1-inch with minimal expansive foam sealant.

#### D. Site Tolerances:

1. Adjust operation, insect screens, hardware, and accessories for a tight fit at contact points and weatherstripping for smooth operation and weathertight closure.

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3.4 CLEANING

- A. Clean units using cleaning material and methods specifically recommended by window manufacturer.
- B. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Avoid damaging protective coatings and finishes.
- D. Remove debris and properly dispose of debris.

3.5 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION 085200





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SECTION 087100 - DOOR HARDWARE

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. Commercial door hardware for the following:
    - a. Swinging doors.
  2. Cylinders for doors specified in other Sections.
  3. Electrified door hardware.
  4. On site inspection of installed hardware, including proper installation of closers for degree of swing.
  5. Job site meeting for locating magnetic hold open devices.
- B. Related Sections include the following:
1. Division 08 Section "Wood Doors" for astragals provided as part of a fire-rated labeled assembly.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
1. Submittals for Division 08 Sections "Hollow Metal Doors and Frames," "Wood Doors," and "Door Hardware" shall be made concurrently.
- B. Product Data: For each product specified. Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: Details of electrified door hardware, indicating the following:
1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. System schematic.
  2. Detail interface between electrified door hardware and fire alarm system.
- D. Samples: For exposed door hardware of each type indicated below, in specified finish, full size. Tag with full description for coordination with the Door Hardware Schedule. Submit samples before, or concurrent with, submission of the final Door Hardware Schedule.
1. As requested by Architect.
  2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

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- E. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
    - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Description of each electrified door hardware function, including location .
    - i. Provide hardware for every door in the project, except as indicated, so that each door functions correctly for its intended use. Where a door is not included in the Door Hardware Schedule at end of Part 3, provide hardware scheduled for similar type opening and review with Architect.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- F. Pre-Order Meeting Minutes: Submit meeting notes regarding coordination, modifications and changes.
- G. Keying Schedule: Meet directly with the Owner to review hardware function and keying requirements. Prepare keying schedule by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- H. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
  1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.
- I. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 01Section "Operation and Maintenance Data."
- J. Warranties: Special warranties specified in this Section.

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1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 1. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware 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, and who is acceptable to manufacturer of primary materials.
  - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
  - 1. Architectural hardware consultant shall be a full time employee of the hardware supplier, shall be located within 2 hours driving time of the project site, and participate in job site meetings, keying and hardware function reviews, coordination and field examination of installed hardware.
- D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- E. Pre-Ordering Meeting: Before ordering hardware, have a meeting with the Contractor, Owner and Architect to review hardware functions, door swing clearances and closer requirements, requirements and conflicts with hold open devices, electronic locking, door stops and other similar hardware requirements affecting the use and operation of each opening.
  - 1. Prepare a list of questions, potential conflicts and questions and distribute to the Architect 5 days before the meeting.
  - 2. Shop drawings, door and frame shop drawings and door hardware schedule shall be furnished to the Architect at least 10 days before the meeting.
  - 3. Review each door on the project and record meeting notes regarding any coordination, modifications and changes. Submit meeting minutes within 3 days of meeting date.
- F. Conditions and Coordination: Hardware supplier shall determine conditions and materials of all doors and frames for proper application of hardware.
  - 1. The Hardware Schedule shall list the actual product series numbers. Hardware supplier shall follow manufacturers' catalog requirement for the actual size of door closers, brackets and holders. Door opening sizes are as noted on the Door and Frame Schedule and all hardware shall be in strict accordance with requirements of height, width, and thickness.

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- G. Regulatory Requirements: Comply with provisions of the following:
1. Comply with all applicable codes. Comply with Americans with Disabilities Act (ADA), as follows:
    - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
      - 1) Operable parts of such hardware shall be 34 inches minimum and 48 inches maximum above the finish floor or ground.
    - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
  2. NFPA 101: Comply with the following for means of egress doors:
    - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
    - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.
    - c. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
    - d. Thresholds: Not more than 1/2 inch high.
  3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- H. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252.
1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill (Positive pressure).
- I. Keying Conference: Conduct conference directly with the Owner. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Requirements for key control system.
  3. Address for delivery of keys.
- J. Preinstallation Conference: Conduct conference at Project site with hardware supplier and hardware installer to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to door hardware including, but not limited to, the following:
1. Inspect and discuss electrical roughing-in 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.

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3. Review required testing, inspecting, and certifying procedures.
4. Review proper installation procedures for locksets, exit devices and closers with Installer and Hardware Supplier.
5. Coordinate job site meeting for locating wall stops and magnetic hold open devices for concealed blocking locations.
6. Coordinate on site inspection of installed hardware, including proper installation of closers for degree of swing, allowing doors to open to door stops without binding.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver keys to Owner by registered mail or overnight package service.

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to fire alarm system.

1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  1. Structural failures including excessive deflection, cracking, or breakage.
  2. Faulty operation of operators.
  3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period for Manual Closers: 10 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, and the Door Hardware Schedule at the end of Part 3.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products.
  - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3.

2.2 HINGES AND PIVOTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hinges:
    - a. Hager Companies.
    - b. McKinney Products Company; Div. of ESSEX Industries, Inc.
    - c. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Standards: Comply with the following:
  - 1. Butts and Hinges: BHMA A156.1.
  - 2. Template Hinge Dimensions: BHMA A156.7.
- C. Quantity: Provide the following, unless otherwise indicated:
  - 1. Two Hinges: For doors with heights up to 60 inches.
  - 2. Three Hinges: For doors with heights 61 to 90 inches.
  - 3. Four Hinges: For doors with heights 91 to 120 inches.
  - 4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
- D. Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

Maximum Door Size (inches)	Hinge Height (inches)	Metal Thickness (inches)	
		Standard Weight	Heavy Weight
40 and under by 1-3/4	4-1/2	0.134	0.180
Over 40 by 1-3/4	5	0.146	0.190

- E. Hinge Weight: Unless otherwise indicated, provide the following:
  - 1. Entrance Doors: Heavy-weight hinges.
  - 2. Interior Doors with Closers: Antifriction-bearing hinges.

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3. Interior Doors:
  - a. General: Standard-weight hinges, oil-impregnated bearings unless specified otherwise.
  - b. Interior doors at Stairs: Shall be heavy weight hinges.
  - c. Interior Wide Throw Hinges: Shall be heavy weight bearing hinges.

F. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Stainless steel, with stainless-steel pin.
2. Interior Hinges: Steel, with steel pin or stainless steel, with stainless-steel pin..
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

G. Hinge Options: Comply with the following:

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
  - a. Outswinging exterior doors.
  - b. Outswinging interior doors with locks.
2. Corners: Square.

H. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
3. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors. Finish screw heads to match surface of hinges.
4. Stainless steel for stainless steel hinges.

## 2.3 LOCKS AND LATCHES

A. Bored Locks: BHMA A156.2, Grade 1 and Grade 2; Series 4000.

1. Falcon Lock Company, an Ingersol Rand Group company, of type and function scheduled.
2. T Series and W Series cylindrical lock and latchsets as scheduled.
  - a. Dane lever, 3-1/2 inch diameter rose.
  - b. 6 pin interchangeable cores.
  - c. 2-3/4 inch backset.

B. Lock Trim: Comply with the following:

1. Lever: Forged or Cast.
2. Escutcheon (Rose): Wrought.
3. Dummy Trim: Match lock trim and escutcheons.

C. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Minimum 1/2-inch latchbolt throw.
2. Deadbolts: Minimum 1-inch bolt throw.

D. Backset: 2-3/4 inches, unless otherwise indicated.

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2.4 AUXILIARY DOOR HARDWARE

- A. Keypads: Where indicated provide keypads to provide keyless access.
- B. Product: Sargent 4291/4292 Keypads.
  - 1. Provide recessed keypad enclosure for exterior keypads.
    - a. Product: Arlington Industries; Recessed Keypad Enclosure with clear cover.

2.5 DOOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flush Bolts:
    - a. Door Controls International.
    - b. Glynn-Johnson; an Ingersoll-Rand Company .
    - c. Ives: H. B. Ives.
    - d. Rixson-Firemark, Inc.; Div. of Yale Security Inc.
    - e. Rockwood Manufacturing Company.
- B. Standards: Comply with the following:
  - 1. Manual Flush Bolts: BHMA A156.16.
- C. Flush Bolts: BHMA Grade 1, designed for mortising into door edge.
- D. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
  - 1. Mortise Flush Bolts: Minimum 3/4-inch throw.
- E. Strikes: Provide matching strikes for heads of doors. Provide dust proof strikes at all floor locations.

2.6 EXIT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Precision Hardware, Inc.; Apex Series. Provide narrow design devices for doors scheduled.
  - 2. Sargent Manufacturing Company; 80 Series.
    - a. Sargent 80 Series. Provide narrow design devices for doors scheduled.
  - 3. Von Duprin; 98 Series. Provide narrow design devices for doors scheduled.
- B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
  - 1. Non-rated exit devices shall have cylinder dogging.
- C. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.



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- D. Outside Trim: Lever with cylinder; Cylinder at doors scheduled to receive pulls; material and finish to match locksets, unless otherwise indicated.
  - 1. Match design for locksets and latchsets, unless otherwise indicated.

2.7 CYLINDERS AND KEYING

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - 1. Cylinders: Provide for exit devices, locksets, locks and latches, 6 pin removable core to match locksets.
- B. Standards: Comply with the following:
  - 1. Cylinders: BHMA A156.5.
- C. Cylinder Grade: BHMA Grade 1.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
  - 1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- E. Construction Keying: Comply with the following:
  - 1. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
    - a. Replace construction cores with permanent cores at completion of project.
- F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
  - 1. Master Key and/or Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
  - 2. Master Keys shall be sent to the Owner by registered mail, return receipt required.
  - 3. Furnish manufacturer's job number to Architect and Owner.
- G. Keys: Provide nickel-silver keys complying with the following:
  - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: "DO NOT DUPLICATE."
  - 2. Quantity: In addition to one extra blank key for each lock, provide the following:
    - a. Cylinder Change Keys: Three for each cylinder keyed differently; Six for each set keyed alike; Four for sets where only two cylinders are keyed alike.
    - b. Master Keys, Grand Master Keys: Six for each set.

2.8 STRIKES

- A. Manufacturers: Same manufacturer as lock, latch and device bolt engaging into strike.
- B. Standards: Comply with the following:
  - 1. Strikes for Cylindrical Locks and Latches: BHMA A156.13.
  - 2. Strikes for Auxiliary Deadlocks: BHMA A156.5.
  - 3. Dustproof Strikes: BHMA A156.16.

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- C. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated.
- D. Dustproof Strikes: BHMA Grade 1.

2.9 OPERATING TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Burns Manufacturing Incorporated.
  - 2. NT Quality Hardware; an Ingersoll-Rand Company.
  - 3. Rockwood Manufacturing Company.
- B. Standard: Comply with BHMA A156.6, solid bar.
- C. Materials: Fabricate from stainless steel, unless otherwise indicated.
  - 1. Door Pulls: 1inch diameter by 10 inches long, concealed mount.
    - Rockwood BF111
    - Burns BF26C
    - Quality BF163-10"
  - 2. Push/Pull Bars: 1inch diameter.
    - Rockwood BF11147 x T1006 Mounting
    - Burns BF26C x 442 x Sim. Mounting as Above
    - Quality BF482 x Sim. Mounting as Above

2.10 CLOSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Surface-Mounted Closers:
    - a. LCN Closers; an Ingersoll-Rand Company).
    - b. Sargent Manufacturing Company; an ASSA ABLOY Group company Div. of ESSEX Industries, Inc.
- B. Standards: Comply with the following:
  - 1. Closers: BHMA A156.4.
  - 2. Closer Holder Release Devices: BHMA A156.15.
- C. Surface Closers: BHMA Grade 1, cast-iron body.
  - 1. Door closers shall have fully hydraulic, full rack and pinion action. Cylinder body shall be 1-1/2" in diameter, and double heat treated pinion shall be 11/16" in diameter.
  - 2. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and hydraulic back-check.
  - 3. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).
  - 4. Closer arms shall have a powder coating finish.

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5. Provide drop, mounting plates for aluminum doors and where required to conceal back of closer.
6. Do not locate closers on the side of doors facing corridors, passageways or similar type areas. Where it is necessary, due to certain conditions and approval of the Architect, to have closers in corridors, provide such closers with parallel arms.
7. Door closers shall be adjusted by the installer in accordance with the manufacturer's templates and written instructions. Closers with parallel arms shall have back-check features adjusted prior to installation.
8. Closers shall conform to all applicable code and law requirements relative to setting closing speeds for closers and maximum pressure for operating interior and exterior doors.
9. Provide closers with full plastic covers, painted to finish indicated.
10. Models:

	LCN	Sargent
Exterior	4111S-CUSH	281 - CPS
	4111S-H-CUSH	281 - CPSH
Interior	4011	281 - 0
	4111	281 - P10
	4111S-CUSH	281 - CPS
	4111S-H-CUSH	281 - CPSH
	4040SEL	2468
Interior- For Electric Room, Mechanical Room, Storage, Soiled Linen, Clean Linen	1461 Series	1431 Series

- D. Swing: Allow door to swing to the maximum degree opening allowable for the swing condition. Where doors with closers do not have a bumper stop, provide closer with CUSH-N-STOP feature. Do not allow leading edge of door to swing into the path of an adjacent door opening.
- E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.11 PROTECTIVE TRIM UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Metal Protective Trim Units:
    - a. Burns Manufacturing Incorporated.
    - b. Don-Jo Mfg., Inc..
    - c. Rockwood Manufacturing Company.

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- B. Standard: Comply with BHMA A156.6.
- C. Materials: Fabricate protection plates from the following:
  - 1. Stainless Steel: 0.050 inch thick; beveled top and 2 sides.
- D. Fasteners: Provide manufacturer's oval head exposed fasteners for door trim units consisting of either machine or self-tapping screws, for installation in counter sunk holes.
- E. Furnish protection plates sized 2 inches less than door width on push side by the following height:
  - 1. Armor Plates: 34 inches.
  - 2. Kick Plates: 8 inches
- F. Door Edge Protectors: InProCorp, 0.060 inch thick PVC 1-inch legs by door thickness, U-shape door edge protectors, full height of door, water based contact adhesive attachment. Color as selected by Architect.

2.12 STOPS AND HOLDERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Glynn-Johnson; an Ingersoll-Rand Company.
  - 2. Hager Companies.
  - 3. Ives: H. B. Ives.
  - 4. Rixson-Firemark, Inc.; Div. of Yale Security Inc. .
  - 5. Rockwood Manufacturing Company.
- B. Standards: Comply with the following:
  - 1. Stops and Bumpers: BHMA A156.16.
  - 2. Mechanical Door Holders: BHMA A156.16.
  - 3. Electromagnetic Door Holders: BHMA A156.15.
  - 4. Door Silencers: BHMA A156.16.
- C. Stops and Bumpers: BHMA Grade 1.
  - 1. Wall Stops: Convex with concealed mounting.
  - 2. Floor Stops: Dome stop, base thickness to accommodate flooring thickness.
- D. Combination Floor and Wall Stops and Holders: BHMA Grade 1.
  - 1. Cast floor stop with hook and eye.
- E. Door Catches: Provide surface-mounted roller catch where indicated. Ives No. 338 or approved substitute.
- F. Wall Stops: For doors, unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.
  - 1. Where floor or wall stops are not appropriate, provide heavy duty overhead holders.
    - a. Glynn-Johnson GJ90.
    - b. Sargent 590.

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- G. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

2.13 SLIDING DOOR HARDWARE

- A. Heavy Duty Pocket Door Sliding Hardware: Stanley PDF150FN, pocket door heavy duty hardware set. (No substitution of hardware capacity. Sizing based upon ease of operation, not door weight) Locate stops for proper clearance of door pulls.
  - 1. Sliding Door Pull and Lock: Accurate No. 2001ADAP-3.

2.14 DOOR GASKETING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Door Gasketing and Door Bottoms:
    - a. National Guard Products, Inc..
    - b. Pemko Manufacturing Co., Inc.
    - c. Reese Enterprises, Inc.
    - d. Zero International, Inc.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
  - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
  - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
  - 3. Door Bottoms: Flexible multi-fin, apply to bottom of door, forming seal with threshold when door is closed.
- C. Weather-Strip Gasketing Models: Listed manufacturers with comparable models to the following:

Product	Pemko	Reese	NGP
Thresholds	as detailed		
Brush Seal	45062AP	970	A626A
Door Sweep	345AV	353	101AV (Sweeps provided in addition to door bottoms)
Set Astragals	Pemko 29310CPK, concealed fastener		
Rain Drip	346C	R201A	16AD
Door Bottom	234PK		

2.15 THRESHOLDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. National Guard Products, Inc.
  - 2. Pemko Manufacturing Co., Inc.

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3. Reese Enterprises, Inc.
4. Zero International, Inc.

B. Standard: Comply with BHMA A156.21.

C. General: Extruded aluminum, depth as required for sill condition. Where thresholds extend out beyond face of frame, provide returned closed ends by miter cutting on a 45 degree angle and return to face of frame.

D. Height: 1/2 inch ADA compliant.

#### 2.16 FABRICATION

A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Steel Machine or Wood Screws: For the following fire-rated applications:
  - a. Mortise hinges to doors.
  - b. Strike plates to frames.
  - c. Closers to doors and frames.
3. Spacers or Sex Bolts: For through bolting of hollow metal doors.
4. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Fasteners for exterior doors shall be stainless steel.

#### 2.17 FINISHES

A. Standard: Comply with BHMA A156.18.

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

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

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- D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
1. BHMA 626 (US26D): Satin chromium plated over nickel, over brass or bronze base metal.
  2. BHMA 630 (US32D): Satin stainless steel, over stainless-steel base metal.
- E. With the exceptions of exit devices, door closers, plates, push bars, pulls, thresholds and weatherstripping, all hardware items shall be furnished in dull chrome finish 26D.
1. Exceptions are as follows:

Exit Devices:	32D
Door Closers:	Sprayed Aluminum
Plates:	32D
Push Bars:	32D
Pulls:	32D
Thresholds:	Aluminum
Astragal Seals:	Anodized Aluminum
Hardware Mullion:	Powder coated to match door.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Contractor shall examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance. If errors in dimensions or preparation are encountered, they are to be corrected by the responsible parties prior to the installation of hardware.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
  1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

#### 3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

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- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
  
- C. Exit devices shall be carefully installed so as to permit friction free operation of crossbar, touch bar and lever. Latching mechanism shall also operate freely without friction or binding. Verify vertical rods stay in the retracted positions and do not rub on the floor.
  
- D. Allow paint to fully cure before application of adhesively applied smoke seals.
  
- E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
  - 1. At doors with local power supplies, provide the low voltage wire and connections from the power supply to the hinge.
  - 2. At electrified hardwired locks, provide the low voltage wiring and terminations within the door from the hinge to the lock.
  
- F. Door closers shall be installed in accordance with the manufacturer's instructions. Each door closer shall be carefully installed, on each door, at the degree of opening dictated by the frame condition relative to adjacent construction and clearances to permit full swing of the door to the door stops. Arm position shall be as shown on the instruction sheets.
  
- G. The adjustments for all door closers shall be the installer's responsibility and these adjustments shall be made at the time of installation of the door closer. The closing speed and the latching speed valves shall be adjusted individually to provide a smooth, continuous closing action without slamming. The delayed action feature or back check valve shall also be adjusted so as to permit the correct delayed action cycle or hydraulic back check cushioning of the door in the opening cycle. All valves shall be properly adjusted at the time of installation. Each door closer has adjustable spring power capable of being adjusted, in the field, from size 1 thru 6. It shall be the installer's responsibility to adjust the spring power for each door closer in exact accordance with the spring power adjustment chart illustrated in the door closer installation sheet packed with each door closer. Coordinate installation of hinges in wood doors to prevent requiring the removal and reinstallation of screws into the edges. Do not remove screws after they have been installed on fire rated doors. Provide proper torque on screws without over tightening and stripping.
  
- H. Thresholds: Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
  
- I. Door Edge Protectors: Allow materials to acclimate to room temperature, but not less than 65 degrees F.
  - 1. Apply contact adhesive to fully coat edge of door, using care not to apply adhesive to door faces. Apply contact adhesive to fully coat back of U-channel, using care not to



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apply adhesive to channel legs. After contact adhesive has dried, apply edge protectors and pressure roll edge to assure material is fully set in adhesive. Top and bottom of protectors shall be cut square and be flush with top and bottom of doors.

- J. Prior to Substantial Completion, the installer, accompanied by representative of the supplier of latchsets and locksets, closers, door control devices, and other major hardware, shall perform the following work:
1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements. Review the location of door closers and verify door closers are properly installed for the degree of swing required to permit maximum opening range of the door without binding or stress that could damage doors and frames. Verify arm position is at proper location.
  2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
  3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

### 3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period so that, from an 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 leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
  2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
  3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

### 3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

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3.7 DOOR HARDWARE SCHEDULE

- A. Each Hardware Set listed below represents the complete hardware requirements for one opening (single door or pair of doors). Furnish the quantities required for each set for the work.

HW 1

Rated –Exit

Door: 137A

Each Leaf Shall Have: Hinges, Narrow Exit Device w/Trim (Classroom Function T561), Closer (Pull Side Mount), Kick Plate, Wall Stop, Silencers

HW 2

Rated – Soiled Linen

Doors: 120A, 128A

Each Leaf Shall Have: Hinges, Lockset (Storeroom Function T581), Closer w/Delay Action Closing (Pull Side Mounted), Kick Plate, Wall Stop, Silencers

HW 3

Sliding

Doors: 112A, 113A, 133A

Each Leaf Shall Have: Pocket Sliding Door Hardware (Stop door with leading edge projecting 4" into opening), Sliding Door Pull and Lock, Full Height Door Edge Protector

HW 4

Clean Linen

Doors: 121A, 129A, 131A

Each Leaf Shall Have: Hinges, Lockset (Storeroom Function T581), Closer (Push Side Mount , Armor Plates, Wall Stops, Silencers

HW 5

Kitchen

Doors: 133B

Each Leaf Shall Have: Hinges, Latch set (Classroom Function T561), Wall Stop, Silencers

HW 6

Bathroom

Doors: 122A, 123A, 126A, 127A, 140A

Have: Hinges, Lockset (Privacy Function T3011), Wall Stop, Silencers

HW 7

Office/Conference

Doors: 104A, 138A, 141A

Each Leaf Shall Have: Hinges, Lockset (Office Function T521), Wall Stop, Silencers

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HW 8

Double Closet

Doors: 141B

Each Leaf Shall Have: Hinges, Lockset (Dummy Function W12), Door Catches, Wall Stop

HW 9

Double Entry

Doors: 124A

Each Pair Shall Have: Hinges, Flush bolts, Rim Exit Device/Cylinder, Lever, Closers, Silencers

HW 10

Existing

Doors: 119A and 125A

Each Leaf Shall Have: Electric Hinge, Hinges, Delayed Egress Rim Exit Device w/Signal Switch/Exterior Cylinder, Power Supply, Emergency Decal, Pull, Closer Cush Stop, Kick Plate, Threshold, Sweep, Door Bottom, Cylinders, Brush Weatherstripping, Interior and Exterior Keypads

Note: Wiring for remote notification to nurses station provided by others.

Operation Narrative: Depressing exit device for 2 seconds initiates 15 second delayed release of exit device. Local audible alarm and signal to remote alarm notification activated 2 seconds after depressing exit device. Keypad from interior permits egress without triggering alarm. Key or keypad from exterior permits ingress without triggering alarm.

HW 11

Existing

Doors: 102.1A and 104.1A

Each Leaf Shall Have: Lockset (Privacy Function T3011)

HW 12

Existing

Doors: 103A, 105A, 106A, 117A, 118A, 132A, 134A and 135A

Each Leaf Shall Have: Lockset (Office Function T521)

HW 13

Existing

Doors: 107A and 109A

Each Leaf Shall Have: Lockset (Storeroom Function T581)

END OF SECTION 087100



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SECTION 088000 - GLAZING

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 glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Doors.
  - 2. Interior borrowed lites.
- B. Related Sections:
  - 1. Division 08 Section "Wood Doors" for factory glazing of wood doors with glazed openings.
  - 2. Division 08 Sections "Clad Wood Windows" for factory glazing of windows.

1.3 DEFINITIONS

- A. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- B. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.5 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
  - 1. For glazing sealants used inside of the weatherproofing system, include printed statement of VOC content.

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1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass.

1.7 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."
  - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
- B. Strength: Where float glass is indicated, provide annealed float glass. Where fully tempered glass or safety glazing is indicated or required by code, provide Kind FT heat-treated float glass.

2.2 GLASS PRODUCTS

- A. Safety Glass (Fully Tempered): ASTM C 1048; Kind FT (fully tempered), Condition A (uncoated), Type I (transparent flat glass); Class 1(clear); Quality q3 (glazing select); conforming to ANZI A97.1.

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2.3 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
  - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
  - 2. Spacer: Manufacturer's standard spacer material and construction.
  - 3. Desiccant: Molecular sieve or silica gel, or blend of both.
  
- B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating-Glass Types" Article and in "Insulating-Laminated-Glass Types" Article.
  
- C. Clear, Insulated Glass Units:
  - 1. Overall Unit Thickness: 5/8 inch.
  - 2. Thickness of Each Glass Lite: 4.0 mm.
  - 3. Outdoor Lite: Class 1 (clear) float glass, except as noted.
    - a. Kind FT (fully tempered) where indicated or required by code.
  - 4. Interspace Content: Air.
  - 5. Indoor Lite: Class 1 (clear) float glass, except as noted.
    - a. Kind FT (fully tempered) where indicated or required by code.
  - 6. Provide safety glazing labeling on fully tempered glass.

2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
  - 1. Neoprene complying with ASTM C 864.
  - 2. EPDM complying with ASTM C 864.
  - 3. Silicone complying with ASTM C 1115.
  - 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

2.5 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:

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- a. Dow Corning Corporation; 791 or 795.
- b. GE Advanced Materials - Silicones; SilPruf NB SCS9000 or UltraPruf II SCS2900.
- c. Pecora Corporation; 895.
- d. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.6 GLAZING TAPES

- A. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.



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2. Presence and functioning of weep systems.
  3. Minimum required face and edge clearances.
  4. Effective sealing between joints of glass-framing members.
- B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance. Protect glass edges as follows:
1. Use a rolling block in rotating glass units to prevent damage to glass corners.
  2. Do not impact glass with metal framing.
  3. Use suction cups to shift glass units within openings. Do not raise or drift glass with a pry bar.
  4. 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.
- D. Apply primers to joint surfaces where required for adhesion of sealants.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.

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1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

### 3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

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- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000



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SECTION 092950 - GYPSUM BOARD ASSEMBLIES

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. Interior gypsum wallboard.
  2. Tile backing panels.
  3. Non-load-bearing steel framing.
  4. Interior suspension systems.
  5. Acoustical insulation in metal-framed assemblies.
  6. Acoustical sealants.
  7. Firestopping at wall and partition perimeters of fire-rated construction.
  8. Sealing at wall and partition perimeters of smoke wall construction.
  9. Coordination with radiant heat installation to insure framing fasteners do not penetrate tubing.
  10. Coordination with vapor retarder installation for continuous barrier where interior partitions meet exterior walls.
- B. Related Sections include the following:
1. Division 05 Section "Cold-Formed Metal Framing" for non-load-bearing steel framing and glass-mat gypsum sheathing.
  2. Division 06 Section "Rough Carpentry" for concealed wood blocking in gypsum board assembly walls.
  3. Division 07 Section "Building Insulation" for thermal insulation and vapor retarders installed in gypsum board assemblies.
  4. Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation" for spray foam installed at exterior walls and in voids of cold-formed metal framing.
  5. Division 07 Section "Penetration Firestopping" for systems installed in openings in walls and floors with and without penetrating items.
  6. Division 07 Section "Fire-Resistive Joint Systems" for fire-resistive joints not covered by work of this Section.
  7. Division 07 Section "Joint Sealants" for sealants not covered by work of this Section.
  8. Division 09 Section "Painting" for coordination/inspection requirements with painting contractor and primers applied to gypsum board surfaces.

1.3 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

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1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated. Include documentation for the following:
  - 1. VOC Content of Sealants: For sealants used inside the weatherproofing system, include a printed statement of the VOC content.
- C. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
  - 1. Submit marked up floor plans with location of all control joints in gypsum board walls and ceilings.
  - 2. Firestopping: For each joint condition where fire-rated walls and partitions interface other walls, floors, structural members or other building structure, provide UL firestop system description and drawing. Show each kind of construction condition and relationships to adjoining construction. Indicate which firestop materials will be used where and thickness for different hourly ratings. Include UL firestop design designation that evidences compliance with requirements for each condition.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory," GA-600, "Fire Resistance Design Manual," or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Deflection Firestop Track: Top runner indicated in fire-resistance-rated assemblies shall be labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Source Limitations for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single source from a single manufacturer.
- C. Source Limitations for Panel Products: Obtain each type of gypsum board and other panel products from a single source from a single manufacturer.
- D. Source Limitations for Finishing Materials: Obtain finishing materials from either manufacturer supplying gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- E. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups using room designated by Architect to demonstrate aesthetic effects and qualities of materials and execution.
  - 1. Install mockups for surfaces indicated to receive textured paint finishes.
  - 2. Simulate finished lighting conditions for review of mockups.

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3. Mockup will be painted under Division 09 Section "Painting" to provide finished condition for viewing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 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.
- C. Stack gypsum panels flat on leveled supports off floor or slab to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- D. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F. Do not exceed 95 deg F when using temporary heat sources.
- E. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

1.8 COORDINATION

- A. Coordinate installation of framing tracks needing to be attached to structural components prior to application of spray-applied fire-resistive materials.
- B. Coordinate the requirements and installation of smoke seals, sound seals and fire resistive joint systems with the application of spray-applied fire-resistive materials.
- C. Coordinate installation of fasteners into overhead floor deck to insure radiant heat tubing is not damaged.
- D. Coordinate installation of interior partitions with vapor retarder installation for continuous barrier where interior partitions meet exterior walls.

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- E. Coordination attachment of runner tracks with radiant heat installation to insure framing fasteners do not penetrate tubing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
  - 2. Products: Subject to compliance with requirements, provide one of the products specified.

### 2.2 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653, G40, hot-dip galvanized, unless otherwise indicated.

### 2.3 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Manufacturers:
  - 1. Clark Dietrich Building Systems.
  - 2. Super Stud Building Products, Inc.
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0625-inch-diameter (8-gage) wire, or double strand of not less than 0.099-inch-diameter (12-gage) wire.
- C. Hanger Attachments to Concrete: As follows:
  - 1. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by a qualified independent testing agency.
- D. Hangers: As follows:
  - 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter (8-gage).
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch-wide flange, with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.
  - 1. Depth: 2 inches, unless indicated otherwise.
- F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.
  - 1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep; where indicated.



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- a. Minimum Base Metal Thickness: 0.0312 inch (22 gage).
- G. Hand-Formable Radius Tracks: Factory fabricated runner track, providing smooth, non-segmented continuous one-piece shape; 0.0329 inch thick, 20 gage; size as indicated.
  - 1. Products: Provide the following products by Radius Track Corporation, (888) 872-3487:
    - a. Hand-Formable Ready-Track.
- H. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock, heavy-duty.
  - 1. Products:
    - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
    - b. Chicago Metallic Corporation; 640-C Drywall Furring System.
    - c. USG Interiors, Inc.; Drywall Suspension System.
    - d. Provide comparable system where fire-rated ceilings are indicated.

#### 2.4 STEEL PARTITION AND SOFFIT FRAMING

- A. Manufacturers:
  - 1. Clark Dietrich Building Systems.
  - 2. Super Stud Building Products, Inc.
- B. Steel Studs and Runners: ASTM C 645.
  - 1. Minimum Base Metal Thickness, Standard Framing: 0.0312 inch (20 gage) minimum, unless otherwise indicated.
    - a. Provide studs with 0.0329 inch (20 gage) minimum thickness at the following locations:
      - 1) For 6 inch and greater framing.
      - 2) For framing over 12 feet high.
      - 3) For door jamb framing.
      - 4) Where indicated.
  - 2. Gauge Equivalent Drywall Framing: For all studs locations, Minimum Design Thickness 0.023 inches.
    - a. Clark Dietrich ProSTUD 20.
    - b. Super Stud The Edge Super 20.
  - 3. Depth: As indicated.
  - 4. Maximum Allowable Deflection: Increase metal thickness where required to meet the following:
    - a. Maximum Allowable Deflection for Drywall Assemblies:  $L/240$  calculated using a 5 pound per square uniform load perpendicular to studs and based on stud properties alone.
- C. Deep-Leg Deflection Track: ASTM C 645 top runner with flanges to allow for 3/4-inch deflection at floors and 1-1/2 inch at roofs.
- D. Firestop Deflection Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs. Provide deflection track with flanges to allow for 3/4-inch deflection at floors and 1-1/2 inch at roofs.

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1. Product: Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
  - E. Radius Track: Factory fabricated runner track, providing smooth, non-segmented continuous one-piece shape.
    1. Product: Radius Track Corporation, (888) 872-3487.
  - F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
    1. Minimum Base Metal Thickness: 0.0598 inch (16 gage), unless indicated otherwise.
  - G. Cold-Rolled Channel Bridging: 0.0538-inch (16 gage) minimum bare steel thickness, with minimum 1/2-inch- wide flange.
    1. Depth: 1-1/2 inches.
    2. Clip Angle: 1-1/2 by 1-1/2 inch, 0.068-inch- thick, galvanized steel.
  - H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
    1. Minimum Base Metal Thickness: 0.0312 inch (20 gage).
    2. Depth: 7/8 inch, unless otherwise indicated.
  - I. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
    1. Configuration: Asymmetrical.
  - J. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, 20 gage, .0329 inch, designed for screw attachment to steel studs and steel rigid furring channels used for furring.
  - K. Deflection Brackets:
    1. Construction: Slotted galvanized steel angle with step bushing to prevent over tightening of fasteners.
    2. Vertical Deflection: 1-1/2 inch total travel.
    3. Product: VertiClip; Signature Industries, (919) 844-0789.
      - a. Series: SL, SDL, SLB, and SLS as required by attachment condition.
  - L. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.
- 2.5 PANELS, GENERAL
- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
  - B. Manufacturers:
    1. G-P Gypsum Corporation.
    2. National Gypsum Company.
    3. United States Gypsum Company.

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2.6 INTERIOR GYPSUM WALLBOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
- B. Type X, GWB:
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
  - 3. Face Sheets: 100 percent post-consumer recycled content.
  - 4. Location: All locations, except as indicated otherwise.
- C. Moisture- and Mold-Resistant Type, GWB-MR: ASTM C 1396/C 1396M with moisture- and mold-resistant core and surfaces.
  - 1. Core: 5/8 inch, Type X.
  - 2. Long Edges: Tapered.
  - 3. Mold-Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  - 4. Face Sheets: 100 percent post-consumer recycled content.
  - 5. Location: Interior face of all exterior walls; walls and ceilings of bathrooms, soiled linens, and janitor closets; and where indicated.
  - 6. Products:
    - a. G-P Gypsum Corp.; Toughrock Mold-Guard Gypsum Board.
    - b. National Gypsum Co.; Gold Bond Brand XP Gypsum Board.
    - c. United States Gypsum Co.; Mold Tough Panels.

2.7 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: Complying with ASTM C 1178/C 1178M.
  - 1. Core: 5/8 inch, Type X.
  - 2. Mold-Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  - 3. Products:
    - a. DensShield Tile Guard; G-P Gypsum Corporation.
    - b. National Gypsum Company; Gold Bond e<sup>2</sup>XP Tile Backer Panel.
  - 4. Locations: Behind wall tile and where indicated.

2.8 TRIM ACCESSORIES

- A. Interior Metal Trim: ASTM C 1047, galvanized steel.
  - 1. Shapes:
    - a. Cornerbead: 1-1/4 inch x 1-1/4 inch external corner with 1/8-inch nose bead. Use at outside corners, unless otherwise indicated.
    - b. LC-Bead (Casing): J-shaped casing with 1/16-inch nose bead ground, not less than 30 gage; exposed long flange receives joint compound; use at exposed panel edges.
    - c. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
    - d. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
  - 2. Accessories for Curved Edges: Corner bead formed of metal, plastic, or metal combined with plastic, with either notched or flexible flanges that are bendable to curvature radius.

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2.9 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper reinforcing tape. Fiberglass tape not permitted.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Setting-Type Joint Compound: 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.
- D. Drying-Type Joint Compound: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.
  - 1. Ready-Mixed Formulation: Factory-mixed product.
- E. Type of Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound or drying-type, all-purpose compound.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound or drying-type, all-purpose compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping compound or drying-type, all-purpose compound.
- F. Joint Compound for Tile Backing Panels:
  - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by manufacturer.

2.10 ACOUSTICAL SEALANT

- A. Products:
  - 1. Acoustical Sealant for Exposed and Concealed Joints:
    - a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
    - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
  - 2. Acoustical Sealant for Concealed Joints:
    - a. Ohio Sealants, Inc.; Pro-Series SC-175 Acoustical Sound Sealant.
    - b. Pecora Corp.; AIS-919.
    - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

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- C. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant , with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24),recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.11 SEALANTS FOR FIRE-RESISTANCE-RATED CONSTRUCTION

- A. General: Provide fire-resistive joint 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 assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. VOC Content of Fire-Resistance-Rated Sealants: Shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Joints in or between Fire-Resistance-Rated Construction: Materials shall comply with Division 07 Section "Fire-Resistive Joint Systems" and submitted UL assemblies.
  - 1. Provide firestopping where fire rated gypsum board assemblies butt masonry, steel deck, joists, beams, and structural members as part of the gypsum board assembly work.
  - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
  - 3. Joints shall be sealed with fire-resistance-rated sealants; use of joint compound for sealing of joints is not permitted.
- D. Exposed Fire-Resistive Joint Sealants: Exposed sealants shall be paintable.

2.12 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Fastening gypsum board to steel members: Type S bugle head.
  - 2. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Sound Attenuation Blankets (Acoustical Insulation), SAB: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with requirements of UL assemblies indicated.
  - 2. Products:
    - a. Certainteed Corporation; Noise Reducer Sound Attenuation Batts.
    - b. Owens Corning; Sound Attenuation Batt Insulation.
    - c. Johns Manville; Fiberglass Sound Control Batts.
    - d. Knauf Insulation; Quiet Therm Acoustical/Thermal Batt Insulation.
- D. Thermal Insulation: As specified in Division 07 Section "Building Insulation."

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- E. Vapor Retarder: As specified in Division 07 Section "Building Insulation."
- F. Insulation Support Anchors: Continuous, galvanized metal support strip, 25 gage, with pre-punched tabs at 8 inches on center.
  - 1. Product: Insul-hold; Insul-Hold Co., Inc.; phone (207) 465-9066.
- G. Firestopping:
  - 1. Provide firestopping where fire rated gypsum board assemblies butt masonry, steel deck, joists, beams, and structural members as part of the gypsum board assembly work. See Division 07 Section "Fire-Resistive Joint Systems."
  - 2. Penetrations through fire-resistant rated and smoke walls and partitions by Divisions 21, 22, 23, 26, 27, and 28 work, including both empty openings and openings containing cables, pipes, ducts and conduits are specified as part of the Divisions 21, 22, 23, 26, 27, and 28 work. Sealing of penetrations shall be in accordance with Division 07 Section "Through-Penetration Firestop Systems."

## 2.13 TEXTURE FINISHES

- A. Products: Subject to compliance with requirements, provide product to match existing.
- B. Primer: As recommended by the finish manufacturer.

## 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.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Post-Installation Inspection: Inspect walls for dents and imperfections, with Installer and painter present, prior to painting. Verify exposed joints are finished up to required heights (to above acoustical ceilings). Inspect wall again after primer and first coat of paint applied, with Installer and painter present. Installer shall touch-up as follows:
  - 1. Touch-up visible gypsum board imperfections before priming of walls.
  - 2. Touch-up imperfections found in field of boards and joints made visible from painting after first finish coat applied.
  - 3. Joint compound touch-up shall be primed and painted and viewed for acceptability before final coat is applied.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building

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structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

- B. Coordinate installation of ceiling runners (tracks) with the installation of the spray-applied urethane foam insulation.

### 3.3 STEEL FRAMING INSTALLATION, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 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 gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
  - 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. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
    - a. Allow for 3/4-inch deflection at floors and 1 inch at roofs.
    - b. Install deflection track top runner or deflection brackets to attain lateral support and avoid axial loading.
    - c. Install deflection firestop track top runner at fire-resistance-rated assemblies.
      - 1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.
- D. Installation interior partitions that intersect exterior walls to permit vapor retarder installation to run continuous past ends of partitions.
- E. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

### 3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend ceiling hangers from building structure 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, countersplaying, or other equally effective means.

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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. Wire Hangers: Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, 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.
  4. Do not attach hangers to steel roof deck. Do not attach fasteners to underside of floor deck that will penetrate radiant heat tubing.
  5. Do not attach hangers to permanent metal forms. Attach hangers to structural members.
  6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck. Attach hangers to structural members.
  7. Do not connect or suspend steel framing from ducts, pipes, or conduit. Attach hangers to structural members.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- F. Sway-brace suspended steel framing with hangers used for support.
- G. Wire-tie furring channels to supports, as required to comply with requirements for assemblies indicated.
- H. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.
1. Hangers: 48 inches o.c.
  2. Carrying Channels (Main Runners): 48 inches o.c.
  3. Furring Channels (Furring Members): 16 inches o.c.
- I. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- 3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING
- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
1. Coordination with radiant heat installation to insure framing fasteners do not penetrate tubing.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.



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- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  - 1. Cut studs 1/2 inch short of full height to provide perimeter relief. Do not fasten studs to top track to allow independent movement of studs and track.
  - 2. For fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure 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 and to make partitions continuous from floor to underside of solid structure.
  - 3. Do not attach fasteners to underside of floor deck that will penetrate radiant heat tubing.
  
- D. Install steel studs and furring at 16 inches o.c., unless otherwise indicated.
  
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
  - 1. Attach both flanges to floor runner track with screws.
  
- F. Curved Partitions, Ceilings and Soffits:
  - 1. Cut top and bottom track (runners) through leg and web at 2-inch intervals for arc length. In cutting lengths of track, allow for uncut straight lengths of not less than 12 inches at ends of arcs.
  - 2. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
  - 3. Support outside (cut) leg of track by clinching steel sheet strip, 1-inch- high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
  - 4. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. Attach studs to bottom runners with 3/8-inch- long pan head framing screws into both flanges. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.
  - 5. Premanufactured Runner Option: Provide pre-manufactured radius runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.
  
- G. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
  - 1. Install two studs at each jamb, unless otherwise indicated.
  - 2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint.
  - 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above, even when partitions are not full height. Provide diagonal bracing at tall partitions to stop deflection and vibration of studs when doors are slammed shut.
  - 4. Extend jamb studs one-piece full height.
  
- H. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

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- I. Installation Tolerance: Framing members shall be within the following limits:
  - 1. Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing, a total variation of 1/4 inch in 8 feet from a true plane.
  - 2. Layout of Walls and Partitions: 1/4 inch from intended position.
  - 3. Plates and Runners: 1/4 inch in 10 feet from a straight line.
  - 4. Studs: 1/4 inch in 10 feet out of plumb, not cumulative.
  - 5. Headers and Sills of Openings: 1/8 inch from level across width of opening.
  - 6. Soffits: 1/4 inch in 10 feet from level straight line.
  - 7. Spacing of Framing Members: Comply with requirements of ASTM C 754.
  
- J. Polyethylene Vapor Retarder: Install to comply with requirements specified in Division 07 Section "Building Insulation."
  
- K. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure. Install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
  - 1. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

3.6 INSTALLATION OF ACOUSTICAL INSULATION

- A. Install sound attenuation blankets (acoustical insulation) at locations indicated before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement. Install insulation in voids as framing is installed that that would be inaccessible after completion of framing.
  
- B. Install a single layer of insulation of required thickness to fill the full depth of cavity, unless otherwise shown. Where cavity requires insulation that is thicker than standard size, install next larger size and compress into cavity.
  
- C. Hold batt insulation in place with insulation support anchors located at 5 feet on center full height of wall, starting at the top of each stud space.
  
- D. Stuff glass fiber loose fill insulation into miscellaneous voids and cavity spaces. Fill box headers, and voids while framing is being erected that will be inaccessible for installation later. Compact to approximately 40 percent of normal maximum volume (to a density of approximately 2.5 pcf).

3.7 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216, except as specified otherwise.
  
- B. Install acoustical insulation, where indicated, before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

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- C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. 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 edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Attachment to Steel Framing: Attach gypsum panels to steel studs so 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. Form control and expansion joints with space between edges of adjoining gypsum panels.
  - 1. Where control joints are not shown, provide control joints at a maximum spacing of 30 feet; review proposed locations with Architect prior to commencement of work.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for 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 beams, joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by beams, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant. Caulk smoke partitions with acoustical sealant on both sides of wall to prevent the passage of smoke. Use fire-rated acoustical sealant for fire-rated walls. Run board to within 1/4 inch of floor slabs to provide full support of resilient base.
- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with casing bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
  - 1. Use fire-rated acoustical sealant for fire-rated walls.
- K. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
  - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
- L. Remove screws that do not hit studs, supports, or blocking and repair hole left by screw removal.

### 3.8 PANEL APPLICATION METHODS

- A. Single-Layer Application:

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1. On ceilings, apply gypsum panels before wall/partition board application to 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 or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
  3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Curved Partitions, Ceilings and Soffits:
1. Install panels horizontally (perpendicular to supports) and unbroken, to the extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
  2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
  3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches o.c.
  4. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.
  5. Allow wetted gypsum panels to dry before applying joint treatment.
- D. Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
  2. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface.
  3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.
- 3.9 INSTALLING TRIM ACCESSORIES
- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Install corner bead at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
1. Install LC-bead (casing bead) where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
  2. Install U-bead where indicated.

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3. Curved-Edge Cornerbead: Use at curved openings.
- D. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.10 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, flanges of corner bead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, beveled edges, and damaged surface areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints and to flanges of trim accessories, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
  1. Level 1: At ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
  2. Level 2: At ceiling plenum areas, concealed areas, and where indicated, for fire-resistance-rated assemblies, and smoke assemblies.
  3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
- E. Where Level 1 gypsum board finish is indicated, embed tape in joint compound. Surface shall be free of excess joint compound.
- F. Where Level 2 gypsum board finish is indicated, fill fastener heads, embed tape in joint compound and apply thin coat of joint compound over all joints and interior angles.
- G. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.
  1. At tapered edge joints, draw compound down to a level plane, leaving a monolithic surface that is flush with paper face. Finish coat shall be feathered a minimum of 8 inches beyond both sides of center of joint tape.
  2. At end-to-end butt joints, draw compound down to minimize hump created by joint tape application. Finish coat shall be feathered a minimum of 16 inches beyond both sides of center of joint tape.
  3. End product shall be a surface that appears level without telegraphing joint locations as high spots when viewed down wall after painting.
  4. Finish board to within 1/4 inch of floor, providing full support for resilient wall base without telegraphing joint.

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3.11 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching existing and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.12 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
  - 1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
  - 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
    - a. Installation of 80 percent of lighting fixtures, powered for operation.
    - b. Installation, 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. Installation of above ceiling automatic fire suppression piping, including leak and pressure testing.
    - g. Installation of ceiling support framing.

3.13 CLEANING

- A. Promptly remove any residual joint compound from adjacent surfaces.

3.14 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

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2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092950





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SECTION 093100 - TILE

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. Ceramic mosaic tile.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated.
  - 1. For adhesives and sealants, include a printed statement of VOC content.
- C. Samples for Initial Selection: For each type of grout indicated consisting of actual products showing full range of colors available. Include Samples of accessories involving color selection.
- D. Test Results: Provide results of waterproof membrane flood tests.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
  - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
  - 1. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

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- C. Store liquid materials in unopened containers and protected from freezing.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient and substrate temperatures and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
  - 1. Maintain temperatures at 50 deg F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

#### 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

#### 2.3 TILE PRODUCTS

- A. Glazed Wall Tile, W3 : Flat tile as follows:
  - 1. Module Size: 3 by 6 inches.
  - 2. Thickness: 5/16 inch.
  - 3. Face: Plain with cushion edges.
  - 4. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    - a. Base for Thin-Set Mortar Installations: Straight, module size 3 by 6 inches.

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- b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size 6 by 2 inches with manufactured outside corners; Style S-4449.
- 5. Products: Rittenhouse Square; Daltile, Div. of Dal-Tile International Inc.
  - a. Color: Matte Desert Gray.

#### 2.4 SETTING AND GROUTING MATERIALS

- A. Manufacturers:
  - 1. LATICRETE International Inc.
  - 2. MAPEI Corporation.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
  - 1. Prepackaged premium dry-mortar mix combined with acrylic resin liquid-latex additive and containing Microban for mold- and mildew-resistance.
    - a. Product: Laticrete International, Inc.; Laticrete 254 Platinum.
- C. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.
  - 1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
    - a. Unsanded grout mixture for joints 1/8 inch and narrower.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Zinc alloy or stainless steel terrazzo strips, 1/8-inch wide at top edge with integral provision for anchorage to mortar bed or substrate unless otherwise indicated.
  - 1. Product: Schluter Systems; Schluter-Schiene.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

#### 2.6 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions, including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.
- B. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
  - 2. Verify that gypsum board substrates for wall tile comply with the surface finish requirements in ANSI A108.01 for installations indicated and the following:
    - a. Flatness shall not vary more than 1/4-inch in 10 feet.
    - b. Verify that substrate is properly supported in corners.
    - c. Verify that fasteners are properly spaced and covered.
    - d. Verify that joint treatment is fully cured.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile. Top setting of coved base is not permitted.
- E. Tile shall lay flat and each edge flush with adjacent tile, free of tilting and skewed tile. Provide additional setting material to shim accent tiles that are thinner than field tiles so face is in same plane.

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- F. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
- G. Lay out tile wainscots to next full tile beyond dimensions indicated.
- H. Grout tile to comply with requirements of the following tile installation standards:
  - 1. For ceramic tile grouts (latex-portland cement grouts), comply with ANSI A108.10.

### 3.3 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
- C. Joint Widths: Install tile on walls with the following joint widths:
  - 1. Glazed Wall Tile: 1/16 inch, unless indicated otherwise.

### 3.4 CLEANING AND PROTECTING

- A. Remove and replace material that is stained or otherwise damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove latex-portland cement grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- C. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

### 3.5 TILE INSTALLATION SCHEDULE

- A. Ceramic Wall Tile on Glass-Mat, Water Resistant Backer Board: Latex portland cement mortar tile setting bed, TCA W245.

END OF SECTION 093100



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SECTION 095113 - ACOUSTICAL PANEL CEILINGS

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. Acoustical panels.
  - 2. Exposed suspension systems.
- B. Related Sections include the following:
  - 1. Division 09 Section "Gypsum Board Assemblies" for suspension systems provided for gypsum board ceilings.
  - 2. Division 21, 22, 23, 26, and 27 Sections for coordination of air handling devices, fire protection devices, and electrical devices installed in ceiling systems.

1.3 DEFINITIONS

- A. CAC: Ceiling Attenuation Class.
- B. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- D. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
  - 1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 2. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:

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- a. Smoke-Developed Index: 450 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes. Store materials flat.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Mechanical, electrical, and other utility service installations above the ceiling plane shall have been completed prior to the installation of the ceilings.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.
  - 2. Test Method for Ceiling Attenuation Class (CAC). Where acoustical panel ceilings are specified to have a CAC, provide units identical to those tested per ASTM E 1414 by a qualified testing agency.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range



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that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

- C. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273.

## 2.2 ACOUSTIC PANELS

- A. Acoustic Panel: C-3 and C-4.
  - 1. Size: 24 inches x 24 inches.
  - 2. Thickness: 3/4-inch thick.
  - 3. Composition: Mineral wool fiber.
  - 4. Surface Finish: Factory-applied latex paint; white.
  - 5. Surface Texture: Fine texture.
  - 6. Edge: Angled tegular.
  - 7. NRC Range: 0.50.
  - 8. CAC Range: 35.
  - 9. Fire Hazard Classification: Class A, 0 - 25 flame spread.
  - 10. Dimensional Stability: Sag resistant at high humidity.
  - 11. Antimicrobial Treatment: Coating based, front and back.
  - 12. Product: USG Interiors, Inc.; Astro ClimaPlus No. 8722.
  - 13. Suspension System Type: A.

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
  - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
  - 1. Power-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 E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

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2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- E. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
  1. Locations:
    - a. For a distance of 10 feet inside exterior doors without Vestibules.
    - b. Where indicated.

## 2.4 METAL SUSPENSION SYSTEMS FOR ACOUSTICAL PANEL CEILINGS

- A. Type A: Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, hot-dip galvanized according to ASTM A 653/653M, with prefinished 9/16-inch- wide metal caps on flanges.
  1. Structural Classification: Intermediate-duty system.
  2. End Condition of Cross Runners: Butt-edge type.
  3. Face Design: Flat, flush.
  4. Cap Material: Steel cold-rolled sheet.
  5. Cap Finish: Painted white.
  6. Product: Donn; DXL T24 Grid.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION, GENERAL

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:

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1. Hangers shall be single lengths of wire without splices; coordinate lengths in deep ceiling cavities.
  2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  3. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings 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 and publications.
  5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Do not use power-actuated fasteners that extend through forms into concrete; floor system has radiant tubes embedded in concrete. Attach hangers to structural members.
  7. Do not attach hangers to steel deck tabs. Attach hangers to structural members.
  8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  10. Exposed pop rivets for grid alignment purposes shall not be permitted.
- C. Suspension system shall be reinforced to support diffusers, light fixtures and any additional members. Install hanger wires to grid at each corner of light fixtures. Coordinate location with electrical and other trades.
1. Each individual fixture and attachment with combined weight of 56 pounds or less shall have two 12-gage wire hangers attached at diagonal corners of the fixture. These wires shall be slack. Fixtures and attachments with a combined weight of greater than 56 pounds shall be independently supported from the structure at all four corners.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels to run in the same direction.

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2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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SECTION 096500 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
  - 1. Solid vinyl floor tile and plank.
  - 2. Vinyl composition floor tile.
  - 3. Sheet vinyl floor covering, without backings.
  - 4. Sheet rubber floor covering, without backing.
  - 5. Resilient base.
  - 6. Resilient molding accessories.
  - 7. Skim coating of existing floors where previous flooring material has been removed.
  - 8. Testing of concrete.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated.
  - 1. Installation Adhesive: Include printed statement of VOC content.
- C. Shop Drawings: For each type of resilient flooring. Include resilient flooring layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, cutouts, and the following:
- D. Samples for Initial Selection: For each type of product indicated.
  - 1. Resilient Accessories: Actual pieces of strips of resilient base showing full range of colors available for each product exposed to view.
- E. Test Results: Provide results of specified alkalinity and adhesion tests, calcium chloride moisture tests, and relative humidity tests specified. Include manufacturer's written moisture requirements for each resilient flooring type specified.
- F. Maintenance Data: For each type of flooring product to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

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1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver resilient flooring materials and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing name of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store resilient flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces and rolls upright.

1.6 PROJECT CONDITIONS

- A. Radiant heat in floor slabs shall operate continuously for a minimum of two weeks before testing for moisture content and before the application of floor coverings.
- B. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient flooring during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- C. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive as determined by manufacturer's recommended bond and moisture test. Radiant heat shall have run for a minimum of two weeks before the installation of flooring.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- E. Close spaces to traffic during resilient flooring installation and for 48 hours after installation.
- F. Install resilient flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 SOLID VINYL FLOOR TILE

- A. Solid Vinyl Floor Tile, F-6: ASTM F 1700.
  - 1. Products:
    - a. Tarkett, Inc.; ID Freedom.
  - 2. Class: Class III, printed film vinyl tile.
  - 3. Type: Type B, embossed surface.
  - 4. Thickness: 0.125 inch (3.2 mm).
  - 5. Size: 12 by 24 inches (305 by 610 mm).
  - 6. Colors and Patterns: As selected by Architect from full range of industry colors.

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2.2 SOLID VINYL FLOOR PLANK

- A. Solid Vinyl Floor Plank, F-3 and F-4: ASTM F 1700; urethane wear layer with aluminum oxide cured by an ultraviolet UV process.
1. Product: Mannington Mills, Inc.; Nature's Paths Vinyl Plank.
    - a. Colors: As follows:
      - 1) Border F-4: Heritage Cherry Select, No. 12103.
      - 2) Field F-3: Heritage Cherry Natural, No. 12105.
  2. Class: Class III, printed film vinyl plank.
  3. Type: Type B, embossed surface.
  4. Overall Thickness: 0.100 inch.
  5. Wear Layer Thickness: 0.020 inch.
  6. Nominal Size: 3 by 36 inches.
  7. Seaming Method: Standard.

2.3 VINYL COMPOSITION FLOOR TILE

- A. Vinyl Composition Floor Tile, F-1: ASTM F 1066.
1. Product: Azrock VET; Azterra.
  2. Class: Class 2, through-pattern tile.
  3. Wearing Surface: Smooth.
  4. Thickness: 0.125 inch.
  5. Size: 12 by 12 inches.
  6. Colors and Patterns: As indicated in the Finish Schedule.

2.4 VINYL SHEET FLOOR COVERING

- A. Unbacked Vinyl Sheet Floor Covering, F-7: ASTM F 1913.
1. Products:
    - a. Johnsonite/Tarkett, Inc.; IQ Optima.
  2. Thickness: 0.080 inch.
  3. Wearing Surface: Smooth.
  4. Sheet Width: 6.5 feet.
  5. Seaming Method: Chemically bonded.
  6. Colors and Patterns: As indicated in the Finish Schedule.

2.5 RUBBER SHEET FLOOR COVERING

- A. Unbacked Rubber Sheet Floor Covering, F-8: ASTM F 1859.
1. Products:
    - a. ECORE International; ECOsurfaces, ECOearthsand.
  2. Type: Recycled rubber resilient flooring.
  3. Thickness: 1/8 inch.
  4. Wearing Surface: Smooth.
  5. Sheet Width: As standard with manufacturer.
  6. Seaming Method: Standard.
  7. Colors and Patterns: As indicated in Materials Legend.

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2.6 RESILIENT WALL BASE

- A. Resilient Base, B-1 & B-1A: ASTM F 1861.
  - 1. Manufacturer: Johnsonite.
  - 2. Material Requirement: Type TP (rubber, thermoplastic).
  - 3. Manufacturing Method: Group I (solid, homogeneous).
  - 4. Style: Cove (base with toe).
  - 5. Minimum Thickness: 0.125 inch.
  - 6. Height:
    - a. B-1: 6 inch.
    - b. B-1A: 4 inch.
  - 7. Lengths: Coils in manufacturer's standard length.
  - 8. Outside Corners: Job formed.
  - 9. Inside Corners: Job formed.
  - 10. Colors and Patterns: As selected by Architect from manufacturer's full range of colors.
  
- B. Contoured Resilient Wall Base, B-2: ASTM F 1861, resilient base formed to replicate routed wood molding profiles and having the following characteristics:
  - 1. Product: Johnsonite; Millwork Wall Finishing System, Inflection Profile.
  - 2. Type (Material Requirement): TP (rubber, thermoplastic).
  - 3. Group (Manufacturing Method): I (solid).
  - 4. Thickness: 3/8-inch at thickest point.
  - 5. Height: 5-1/4- inches.
  - 6. Inside and Outside Corners: Job formed.
  - 7. Colors: As selected by Architect from manufacturer's full range of colors.

2.7 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
  - 1. Manufacturer: Johnsonite.
  
- B. Material: Vinyl.
  
- C. Transition Strips: The following product identification numbers are for products manufactured by Johnsonite. Provide listed products or equal from one of listed manufacturers.
  - 1. Carpet to Resilient: No. CTA-XX-D.
  - 2. Resilient to Concrete: No. RRS-XX-C.
  - 3. Carpet to Concrete: No. EG-XX-G.
  
- D. Colors and Patterns: As selected by Architect from manufacturer's full range of colors.

2.8 INSTALLATION MATERIALS

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
  
- B. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
  - 1. Product: Ardex; SD-F Feather Finish.



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- C. Adhesives (General): Premium grade, water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. VCT Tile Adhesives: Not more than 50 g/L.
    - b. Cove Base Adhesives: Not more than 50 g/L.
  - 2. Provide spray adhesive for VCT.
- D. Adhesive for Solid Vinyl Plank: Solvent-free, cross-linking, moisture resistant transition pressure sensitive adhesive; product shall be suitable over new concrete substrates with in-situ moisture measurements of 90 percent RH as measure by ASTM F 2170.
  - 1. Product: Mannington Mills, Inc.; M-Guard V-88 Adhesive.
- E. Integral-Flash-Cove-Base Accessories:
  - 1. Cove Strip: 1-inch radius provided or approved by manufacturer.
  - 2. Cap Strip: Tapered vinyl cap provided or approved by manufacturer.
  - 3. Corners: Metal inside and outside corners and end stops provided or approved by manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: ASTM F 710 and the following:
  - 1. Verify that 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 flooring manufacturer, and with the specified requirements.
  - 2. Testing shall be conducted as follows:
    - a. Maintain a minimum temperature of 70 deg F in spaces to receive flooring for at least 72 hours prior to and during the tests.
    - b. Perform the tests at rate of not less than 1 test/1000 sq. ft. of floor area.
    - c. Provide additional tests at floors with radiant heat after 2 weeks of heat operation.

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3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  4. Moisture Testing: Perform tests recommended by manufacturer and as follows.
    - a. Anhydrous Calcium Chloride Test: Perform test in accordance with ASTM F 1869, except area of CaCl<sub>2</sub> dish shall not be deducted.
    - b. Relative Humidity Test: Perform test using in situ probes, ASTM F 2170.
      - 1) Locate radiant heat tubing in test location before drilling holes for probes.
    - c. 80 percent of the moisture tests conducted shall be relative humidity tests.
  5. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, a maximum 75 percent relative humidity level measurement, or greater if permitted by the flooring manufacturer, and manufacturer's requirements for alkalinity and adhesion are met.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Existing Floor Slabs: Scrape and remove adhesive from floor where existing floor covering are removed. Trowel apply underlayment compound over entire floor to smooth substrate surface and prevent telegraphing of surface irregularities. Level and smooth over trench cut areas to prevent telegraphing of trench cut and patching through finish flooring.
- E. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- F. Do not install resilient flooring until it is same temperature as space where it is to be installed.
  1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.3 RESILIENT FLOORING INSTALLATION, GENERAL
- A. Install in accordance with manufacturer's written instructions and requirements of this Section.
  - B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
  - C. Extend flooring into toe spaces, door reveals, closets, and similar openings. Extend flooring to center of door openings.
  - D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor covering as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

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- E. Install flooring on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

### 3.4 FLOOR TILE AND PLANK INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile and floor plank.
- B. Lay out floor tiles and floor planks from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter. Install tiles and floor planks square with room axis, unless otherwise indicated.
- C. Match floor tiles and floor planks for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Verify pattern and grain direction with Architect prior to installation.
- D. Adhere floor tiles and floor planks to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections. Tiles and planks shall be aligned straight with tight joints. Stagger the end joints of planks a minimum of 4 inches. Pay attention to the randomness of the plank layout to avoid establishing a repeating pattern.
- E. Hand roll tiles where required by tile manufacturer.

### 3.5 INSTALLATION OF SHEET FLOOR COVERING

- A. Comply with manufacturer's written instructions for installing floor coverings, including those for trowel notching, adhesive mixing, and adhesive open and working times.
- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out floor coverings as follows:
  - 1. Maintain uniformity of floor covering direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
  - 3. Match edges of floor coverings for color shading and pattern at seams.
  - 4. No cross seams allowed.
- D. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- E. Seamless Installation:
  - 1. Chemically-Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless floor covering. Prepare seams and apply

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compound to produce tightly-fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.

- F. Integral-Flash-Cove Base: Cove floor coverings 6 inches up vertical surfaces. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.
  - 1. Install metal corners at inside and outside corners.
- G. Hand roll sheet floor coverings in both directions from center out to embed floor coverings in adhesive and eliminate trapped air. At walls, door casings, and other locations where access by roller is impractical, press floor coverings firmly in place with flat-bladed instrument.

### 3.6 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. 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. Provide on fronts and exposed sides and backs of floor-mounted casework. Where toe space is less than base height, cut down base to proper height.
- C. Install straight base before installation of carpet.
- D. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- E. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- F. Do not stretch resilient base during installation.
- G. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- H. Job-Formed Corners: Provide job-formed corners everywhere, except as noted, as follows:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
  - 3. Adhere base to substrate with contact adhesive 12 inches each side of outside corner to properly hold base in permanent proper position in tight contact with wall. Base shall run continuous around corners with butt joints 12 inches minimum for corner.
- I. Contoured Resilient Wall Base: Saw cut inside and outside corners with electric miter saw. Corners shall be even and uniform with miters tight and aligned without gaps or openings. Glue inside and outside corners with contact bond adhesive applied to mitered surface areas.

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3.7 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor coverings that would otherwise be exposed.

3.8 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient floorings and accessories.
- B. Perform the following operations immediately after completing flooring installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces using cleaner recommended by resilient floor covering manufacturers.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
    - a. Do not wash surfaces until after time period recommended by manufacturer.
  - 4. Not more than 7 days after completion of installation, apply 1 coat of sealer/ wax to a clean, dry VCT floor covering per manufacturer's requirements, protecting surface with uniform coating and gloss. Work shall be done by a floor care subcontractor.
- C. Protect flooring products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
- D. Final cleaning and buffing specified in Division 01 Section "Closeout Procedures."
- E. Cover resilient flooring with undyed, untreated building paper until Substantial Completion.
  - 1. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 096500



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SECTION 096800 - CARPET

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. Tufted carpet.
  2. Testing of concrete.
- B. Related Sections include the following:
1. Division 09 Section "Resilient Flooring" for resilient wall base and accessories installed with carpet.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For the following, including installation recommendations for each type of substrate:
1. Installation Adhesive: Include printed statement of VOC content.
- C. Shop Drawings: Show the following:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  2. Carpet type, color, and dye lot.
  3. Seam locations, types, and methods.
  4. Type of subfloor.
  5. Type of installation.
  6. Pattern type, repeat size, location, direction, and starting point.
  7. Pile direction.
  8. Type, color, and location of insets and borders.
  9. Type, color, and location of edge, transition, and other accessory strips.
  10. Transition details to other flooring materials.
- D. 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: 12-inch- square Sample.
  2. Exposed Edge Stripping and Accessory: 12-inch- long Samples.
  3. Carpet Seam: 6-inch Sample.
  4. Mitered Carpet Border Seam: 12-inch- square Sample. Show carpet pattern alignment.

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- E. Product Schedule: For carpet. Use same room and product designations indicated on Drawings.
- F. Test Results: Provide results of specified alkalinity and adhesion tests, calcium chloride moisture tests, and relative humidity tests. Include manufacturer's written moisture requirements for each carpet type specified.
  - 1. Provide results of adhesive bond tests for all adhesive products used.
- G. Adhesive Certificates: Carpet manufacturer shall certify that proposed adhesives are acceptable for use with carpet.
- H. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet, 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.
- I. Warranties: Special warranties specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Source Limitations: Obtain each type of carpet through a single source from a single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review specified moisture test results, alkalinity and adhesion tests, ambient conditions, ventilation procedures, installation process, adhesive application, seam sealing procedures and seam layouts. Compare results with manufacture's specified requirements for each product.

#### 1.5 LAYOUT

- A. Seam Layout: Layout differing from approved Shop Drawings that is unacceptable to the Architect shall be sufficient reason for rejection.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with CRI 104, Section 5, "Storage and Handling."
- B. Deliver materials to Project site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.
- C. Store materials on-site in original undamaged packages, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, with continuous blocking off floor.



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1.7 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Radiant heat in floor slabs shall operate continuously for a minimum of two weeks before the testing for moisture content and adhesive bond and before the application of floor coverings.
- C. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at and will be continuously maintained at the levels indicated for Project when occupied for its intended use.
- D. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, and concrete slabs have pH range recommended by carpet manufacturer.
- E. Where demountable items are indicated for installation on top of carpet, install carpet before installing these items.

1.8 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.
- B. Special Warranty for Carpet: Written warranty, signed by carpet cushion manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to failure of substrate, vandalism, or abuse. Warranty shall not require use of chair pads.
  - 2. Failures include, but are not limited to, surface wear including more than 10 percent loss of face fiber, edge raveling, snags, loss of tuft bind strength, zippering, backing resiliency loss, and delamination.
  - 3. Warranty Period: Lifetime Commercial Limited.

1.9 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: Scraps large enough for patching for each type indicated.

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PART 2 - PRODUCTS

2.1 CARPET

- A. Carpet, F-2: Shall be Shaw Fusion 50786, in color selected by Architect from manufacturer's full range of options. No seconds or imperfections shall be acceptable. Carpet shall meet the following minimum construction:

1. Construction:	Multi-level pattern loop.
2. Dye Method:	72% Solution dyed / 28% space dyed.
3. Pile Fiber and Type:	eco*solution Q™ nylon.
4. Gauge:	1/12.
5. Stitches per Inch:	10.0.
6. Pile Height:	0.159 inch.
7. Face Weight:	30.0 oz./sq. yd.
8. Backing System:	Classicbac.
9. Width:	12 feet.

2.2 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type provided by or recommended by carpet manufacturer.
- B. Trowelable Leveling and Patching Compounds: Portland-cement-based formulation provided by or recommended by carpet manufacturer.
- C. Adhesives for Carpets: Premium grade, water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is recommended by the carpet manufacturer.
1. VOC Limits: Provide adhesives with VOC content not more than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
  2. Adhesives shall be compatible with radiant heat systems.
- D. Seaming Cement: Adhesive product recommended by carpet manufacturer for sealing seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.
- B. Examine carpet for type, color, pattern, and potential defects.
- C. Concrete Slabs : Verify that concrete slabs comply with ASTM F 710 and the following:

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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 manufacturer, and with the following specified requirements:
    - a. Testing shall be conducted as follows:
      - 1) Perform tests on slabs to receive glue down carpet installation at rate of 1 test/1000 sq. ft. of floor area.
      - 2) Maintain a minimum temperature of 70 deg F in spaces to be tested for not less than 72 hours prior to and during tests.
      - 3) Provide additional tests at floors after radiant heat has been in operation for not less than 2 weeks.
    - b. Alkalinity and Adhesion Testing: Shall result in pH range recommended by carpet manufacturer when subfloor is wetted with potable water and pHydriion paper is applied. Perform pH tests on concrete floors regardless of age or grade level.
    - c. Calcium Chloride Moisture Tests: Tests shall be conducted in accordance with ASTM F 1869-02, except that area of CaCl<sup>2</sup> dish shall not be deducted.
    - d. Relative Humidity Test: Perform test using in situ probes, ASTM F 2170.
      - 1) Locate radiant heat tubing in test location before drilling holes for probes.
    - e. 80 percent of the moisture tests conducted shall be relative humidity tests.
  2. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, a maximum 75 percent relative humidity level measurement, or greater if permitted by the carpet manufacturer, and manufacturer's requirements for alkalinity and adhesion are met.
  3. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
  4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
- D. If conditions detrimental to work are encountered, prepare written report, signed by Installer, documenting unsatisfactory conditions and send to the Architect.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, unless more stringent requirements are required by manufacturer's written instructions.
- C. Level subfloor within 1/4 inch in 10 feet, noncumulative, in all directions using product recommended by manufacturer. Sand or grind protrusions, bumps, and ridges.
  1. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by carpet manufacturer.

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- D. 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 manufacturer.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.
- F. Concrete Subfloor Preparation: Apply concrete slab primer, according to manufacturer's directions, where recommended by carpet manufacturer.

### 3.3 CARPET INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
  - 1. Bevel adjoining border edges at seams with hand shears.
- C. Do not bridge building expansion joints with carpet.
- D. Where demountable partitions or other items are indicated for installation on top of finished carpet, install carpet before installation of these items.
- E. Cut and fit carpet 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 manufacturer.
- F. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. 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.
- H. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.

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- B. Protect installed carpet and carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet 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 manufacturers and carpet adhesive manufacturer to ensure carpet is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 096800



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SECTION 097200 - WALL COVERINGS

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. Vinyl wall covering.
- B. Related Sections:
  - 1. Division 06 Section "Finish Carpentry" for perimeter wood trim at magnetic wall covering.
  - 2. Division 09 Section "Painting" for priming wall surfaces.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittals Procedures."
- B. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.
  - 1. For adhesives, include printed statement of VOC content.
- C. Samples for Verification: Full width by 36-inch- long section of each wall covering.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed 5 projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Surface-Burning Characteristics: As follows, per ASTM E 84:
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 50 or less.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and

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temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

- B. Lighting: Do not install wall covering until a lighting level of not less than 30 fc is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

#### 1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed, that are from the same run number or dye lot, and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Wall-Covering Materials: For each type, full-size units equal to 2 percent of amount installed. Provide rolls of each type of wall covering from same print run or dye lot.

### PART 2 - PRODUCTS

#### 2.1 WALL COVERINGS

- A. General: Provide rolls of each type of wall covering from same print run or dye lot.

#### 2.2 VINYL WALL COVERING

- A. Vinyl Wall Covering, W-5:
  - 1. Product: D L Couch; H2O Dew.
  - 2. Vinyl Wall-Covering Standards: Provide products complying with FS CCC-W-408D for Type II, Medium-Duty products.
  - 3. Total Weight Excluding Coatings: 20 oz./linear yard.
  - 4. Width: 53/54 inches.
  - 5. Backing: Nonwoven fabric.
  - 6. Pattern Match: Repeat 18" vertical, 52" horizontal; do not reverse.
  - 7. Color/Pattern: R2-HO-05.
- B. Vinyl Wall Covering, W-6:
  - 1. Product: Versa Wallcovering; Sakai Stripe.
  - 2. Vinyl Wall-Covering Standards: Provide products complying with FS CCC-W-408D for Type II, Medium-Duty products.
  - 3. Total Weight Excluding Coatings: 20 oz./linear yard.
  - 4. Width: 52/54 inches.
  - 5. Backing: Manufacturer's standard.
  - 6. Pattern Repeat: 18" vertical, 26.5" horizontal.
  - 7. Colors, Textures, and Patterns: A97-112 Aspen.



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2.3 ACCESSORIES

- A. Adhesive for Vinyl Wall Covering: Premium clear, mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application; with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
- D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

- A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.
- B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners only.
- C. Install strips in same order as cut from roll.
- D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- E. Match pattern 72 inches above the finish floor.
- F. Install seams vertical and plumb at least 6 inches from outside corners and 3 inches from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.

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- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- H. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

- A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

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SECTION 099000 - PAINTING

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. Exposed exterior items and surfaces with low VOC coatings complying with ME DEP regulations.
  2. Exposed interior items and surfaces with low VOC coatings complying with ME DEP regulations.
  3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Related Sections include the following:
1. Division 04 Section "Unit Masonry Assemblies" for preparation of concrete masonry.
  2. Division 05 Section "Structural Steel Framing" for shop priming structural steel.
  3. Division 05 Section "Steel Decking" for shop finish on metal deck to be field finished.
  4. Division 05 Section "Metal Fabrications" for shop priming ferrous metal.
  5. Division 06 Section "Finish Carpentry" for surface preparation of exterior wood siding and trim; for interior stock standing and running trim; and for finish carpentry.
  6. Division 06 Section "Architectural Woodwork" for surface preparation of custom interior standing and running trim; and for shop finishing of architectural casework.
  7. Division 08 Section "Hollow Metal Doors and Frames" for factory priming steel doors and frames.
  8. Division 08 Section "Clad Wood Windows" for surface preparation of interior surface of windows.
  9. Division 09 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.
  10. Review all sections for shop primed items requiring field painting.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
  3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
  4. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.

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5. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

#### 1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each paint system indicated. Include block fillers and primers.
  1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
  2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
  3. Include printed statement of VOC content for each product.
- C. Schedule: Provide schedule of all surfaces to be coated, with prime and finish coat material listed, and manufacturer's recommended wet film thickness.
- D. Samples: For each type of exposed finish required, submit color chips, 3- by 5-inches, matching colors indicated on Finish Schedule.
- E. Manufacturer Certificates: Signed by manufacturers certifying that products with limit VOC amounts specified comply with requirements.
- F. Qualification Data: For Applicator.
- G. Color Mix Code: For all colors used for Project to include in Owner's Manual.

#### 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced Applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Duplicate finish of approved sample Submittals.
  1. Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
    - a. Wall Surfaces: Provide samples of at least 100 sq. ft.
    - b. Small Areas and Items: Architect will designate items or areas required.
  2. After permanent lighting and other environmental services have been activated, apply benchmark samples, according to requirements for the completed Work. Provide required sheen, color, and texture on each surface.
    - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
  3. Final approval of colors will be from benchmark samples.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
  - 8. VOC content.
  
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly.
  - 2. Remove oily rags and waste daily.
  - 3. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

- A. Apply paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
  
- B. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
  - 2. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
  - 1. Quantity: Furnish Owner with not less than 1 gal., of each material and color applied for Owner's use during move in.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

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- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
1. Benjamin Moore & Company (Moore).
  2. Devoe High Performance Coatings (DC); a division of Akzo Nobel (formerly ICI Paints).
  3. Glidden Professional (GP); a division of Akzo Nobel (formerly ICI Paints).
  4. Great Lakes Laboratories (GLL).
  5. Sherwin-Williams Co. (S-W).
  6. Tnemec Company, Inc. (Tnemec).
  7. Flame Control Coatings, LLC (Flame Control); phone: (716) 282-1399.

2.2 COATINGS MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best quality coating material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers listed in the specification schedule. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
  2. Where schedule says no substitution, use proprietary product only. Do not propose substitution, as the products from the other manufacturers have been considered, and are not acceptable.
- C. VOC Compliance for Exterior and Interior Paints and Coatings: Provide the manufacturer's formulation for the products specified below that are VOC compliant with the State of Maine Department of Environmental Protection Regulation, "Chapter 151: Architectural and Industrial Maintenance (AIM) Coatings" and the following chemical restrictions expressed in grams per liter:
1. Flat Paints and Coatings: VOC content of not more than 100 g/L.
  2. Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
  3. Non-Flat Paints and Coatings - High Gloss: VOC content of not more than 250 g/L.
  4. Anticorrosive (Rust Preventative) Coatings: VOC content of not more than 400 g/L.
  5. Clear Wood Coatings:
    - a. Varnishes: VOC content of not more than 350 g/L.
  6. Fire Resistive Coatings: VOC content of not more than 350 g/L.
  7. Fire Retardant Coatings:
    - a. Clear: VOC content of not more than 650 g/L.
    - b. Opaque: VOC content of not more than 350 g/L.
  8. Floor Coatings: VOC content of not more than 250 g/L.
  9. Industrial Maintenance Coatings (IMC): VOC content of not more than 340 g/L.
  10. Interior Wood Clear and Semi-Transparent Stains: VOC content of not more than 550 g/L.
  11. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

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12. Quick-Dry Enamels: VOC content of not more than 250 g/L.
13. Quick-Dry Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
14. Specialty Primers, Sealers, and Undercoaters: VOC content of not more than 350 g/L.

D. Colors: Provide color selections made by the Architect.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator and drywall subcontractor present, under which painting will be performed for compliance with paint application requirements.
1. Inspect walls for dents and imperfections prior to painting. Inspect walls again after primer and first coat of paint applied, with Applicator and drywall subcontractor present. Drywall subcontractor shall touch-up as follows:
    - a. Touch-up visible gypsum board imperfections before priming of walls.
    - b. Touch-up imperfections found in field of boards and joints made visible from painting after first finish coat applied.
  2. If unacceptable conditions are encountered, prepare written report, endorsed by Applicator, listing conditions detrimental to performance of work.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  4. Application of coating indicates Applicator's acceptance of surfaces and conditions within a particular area.
  5. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of specified finish materials to ensure use of compatible primers.
1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

#### 3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

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1. Provide barrier coats over incompatible primers or remove and reprime.
  2. Cementitious Materials: Prepare concrete unit masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze.
    - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
  3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer.
    - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood.
    - c. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
    - d. If transparent (clear or stained) finish is required, backprime with spar varnish.
  4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's standards.
    - a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    - b. Touch up bare areas and shop-applied prime coats that have been damaged. Clean with solvents recommended by paint manufacturer and SSPC SP2; and touch up with same primer as the shop coat.
  5. Galvanized Surfaces: Uniformly abrade galvanized surfaces with a palm sander and 60 grit aluminum oxide so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
    - a. Clean field welds with nonpetroleum-based solvents complying with SSPC's standards so surface is free of oil and surface contaminants.
  6. PVC Trim and Decorative Components: Clean surfaces of dirt, oil, and other foreign substances with mixture of water and mild detergent as recommended by manufacturer. Remove blemishes on surfaces exposed to view by sanding smooth and dust off.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.



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3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
  2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  3. Provide finish coats that are compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
  5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  9. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer over metal surfaces that have been shop primed and touchup painted.
  3. If undercoats, stains, or other conditions show through final coat of paint, 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.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Paint all exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color-coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment at all locations except mechanical and electrical rooms.

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- D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- E. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions. Walls shall have roller finish.
  - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- F. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- G. Mechanical and Electrical Work: Painting of mechanical, plumbing, fire protection, and electrical work is limited to items exposed in occupied spaces (outside mechanical and electrical rooms).
- H. Mechanical, plumbing, and fire protection items to be painted include, but are not limited to, the following:
  - 1. Piping, pipe hangers and supports.
  - 2. Heat exchangers.
  - 3. Tanks.
  - 4. Ductwork, including interior of ductwork visible through air devices.
  - 5. Exposed rooftop units.
  - 6. Accessory items.
- I. Electrical items to be painted include, but are not limited to, the following:
  - 1. Conduit and fittings.
  - 2. Switchgear.
  - 3. Panelboards.
- J. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- K. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- L. Transparent (Clear or Stained) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

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1. Provide satin finish for final coats, unless otherwise noted.
- M. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- N. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- O. Exterior Ferrous Metal Items to Be Painted Include, but Are Not Limited To, the Following:
  1. Steel doors and frames.
  2. Bollards.
  3. Metal fabrications; see Division 05 Section "Metal Fabrications."
  4. Miscellaneous metal items, including galvanized steel.
- P. Interior Ferrous Metal Items to Be Painted Include, but Are Not Limited To, the Following:
  1. Steel doors and frames.
  2. Handrails and guardrails.
  3. Exposed construction, including metal deck.
  4. Wood door glass lite kits.
  5. Access panels (both sides).
  6. Metal fabrications; see Division 05 Section "Metal Fabrications."
  7. Miscellaneous metal items.

### 3.4 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the Project site.
  1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

### 3.5 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
  1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 EXTERIOR PAINT SCHEDULE

- A. VOC Compliance, General: Provide the manufacturers' formulations for the products specified below that comply with the VOC requirements for the State of Maine Department of Environmental Protection in paragraph 2.02.C of this Section.

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- B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces: Primer is not required on shop-primed items, except new zinc-coated (galvanized) steel doors and frames, which require a primer under this specification.
1. Semigloss, Acrylic-Modified Alkyd Enamel Finish: 2 IMC finish coats over a primer.
    - a. Primer: Quick-drying, corrosion resistant, single component, acrylic-modified alkyd metal primer applied to galvanized metals not previously shop-primed applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product. Moore and S-W do not have exterior products meeting semigloss requirements.
      - 1) DC: 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish; 2.5 mils DFT.
    - b. First and Second Coats: Semigloss, exterior, single component, acrylic-modified alkyd enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product. Moore and S-W do not have exterior products meeting requirements
      - 1) DC: IMC 4216-XXXXL, Devflex 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel; 8.0 mils DFT.

### 3.7 LOW VOC INTERIOR COATINGS

- A. VOC Compliance, General: Provide the manufacturers' formulations for the products specified below that comply with the VOC requirements for the State of Maine Department of Environmental Protection in paragraph 2.02.C of this Section.
- B. Gypsum Board: Provide the following finish systems over interior gypsum board:
1. Flat Acrylic Finish, GPDW Soffits and Ceilings: 2 finish coats over a primer.
    - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Ultra Spec 500 Interior Latex Primer No. N534; 1.8 mils DFT.
      - 2) GP: 1000-1200, Prep & Prime Hi-Hide Wall Interior Water-Based Primer Sealer; 1.9 mils DFT.
      - 3) S-W: ProMar 200 Interior Latex Primer, B28W08200 Series; 1.1 mils DFT.
    - b. First and Second Coats: Flat, acrylic-latex-based, interior paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Ultra Spec 500 Interior Latex Flat Finish No. N536; 3.6 mils DFT.
      - 2) GP: 1210-XXXX, Ultrahide Latex Flat Interior Wall Paint; 2.6 mils DFT.
      - 3) S-W: ProMar 200 Interior Latex Flat, B30W200 Series; 2.6 mils DFT.
  2. Walls for Vinyl Wall Coverings: Prime walls designated to receive vinyl wall coverings with the following:
    - a. Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Ultra Spec 500 Interior Latex Primer No. N534; 1.8 mils DFT.

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- 2) GP: 1030-1200, Ultra-Hide PVA Interior Primer-Sealer General Purpose Wall Primer; 1.5 mils DFT.
  - 3) S-W: ProMar 200 Latex Primer, B28W08200 Series; 1.1 mils DFT.
3. Low-Luster (Eggshell), Acrylic-Enamel Finish, Walls: 2 finish coats over a primer.
- a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
    - 1) Moore: Ultra Spec 500 Interior Latex Primer No. N534; 1.8 mils DFT.
    - 2) GP: 1000-1200, Prep & Prime Hi-Hide Wall Interior Water-Based Primer Sealer; 1.9 mils DFT.
    - 3) S-W: ProMar 200 Interior Latex Primer, B28W08200 Series; 1.1 mils DFT.
  - b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
    - 1) Moore: Ultra Spec 500 Interior Latex Eggshell Finish No. N538; 3.6 mils DFT.
    - 2) GP: 1412-XXXXV Ultrahide 150 Interior Eggshell Paint; 2.8 mils DFT.
    - 3) S-W: ProMar 200 Interior Latex Eg-Shel, B20W2200 Series; 3.2 mils DFT.
- C. Wood Trim and FRP Column Surrounds, Opaque Finish (Note: Interior frames and sash of clad wood windows are factory finished) : Provide the following paint finish systems over new, interior wood surfaces:
1. Semigloss, Acrylic-Enamel Finish (Opaque Trim): 2 finish coats over a wood undercoater/primer.
    - a. Primer: Stain-blocking, acrylic-latex-based, interior wood undercoater, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Fresh Start High-Hiding All-Purpose Primer No. 056; 1.4 mils DFT.
      - 2) GP: 3210-1200 Prep & Prime Gripper Multi-Purpose Interior/Exterior Water-Based Primer Sealer; 1.5 mils DFT.
      - 3) S-W: Premium Wall & Wood Primer B28W8111 Series; 1.8 mils DFT.
    - b. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Ultra Spec 500 Interior Latex Semi-Gloss Finish No. N539; 3.6 mils DFT.
      - 2) GP: 1416-XXXX Ultrahide Interior Latex Semi-Gloss Wall & Trim Enamel; 2.8 mils DFT.
      - 3) S-W: ProMar 200 Interior Latex Semi-Gloss, B31W2200 Series Series; 3.0 mils DFT.

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- D. Ferrous Metal: Provide the following finish systems over ferrous metal. Primer is not required on shop-primed items, except steel doors and frames, which require a primer under this specification. Prime bare spots of ferrous metals.
1. Semigloss, Water Based Alkyd Enamel Finish, All Surfaces Except Handrails: 2 finish coats over a primer.
    - a. Primer: Quick-drying, corrosion resistant, single component, acrylic-modified alkyd primer or self cross-linking acrylic primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Advance Waterborne Interior Alkyd Primer No. 790; 1.6 mils DFT.
      - 2) DC: 4020-1000 Devflex 4020PF Direct to Metal Primer & Flat Finish; 3.0 mils DFT.
      - 3) S-W: Pro Industrial Pro-Cryl Universal Primer B66-310 Series; 3.0 mils DFT.
    - b. First and Second Coats: Semigloss, single component, acrylic-modified alkyd interior enamel or single-component, pre-catalyzed waterborne acrylic epoxy applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Advance Waterborne Interior Alkyd Gloss No. 794; 3.2 mils DFT.
      - 2) GP: 1506-XXXX Dulux Advanced Oil Interior/Exterior Semi-Gloss Wall & Trim Enamel; 4.0 mils DFT.
      - 3) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K45-150 Series; 3.0 mils DFT.
  2. Semigloss, Water Based Epoxy Enamel Finish, Handrails: 2 finish coats over shop applied primer.
    - a. First and Second Coats: Semigloss, waterborne epoxy or polyamine epoxy finish applied at spreading rate recommended by the manufacturer to achieve a total dry mill thickness of not less than indicated for product.
      - 1) Moore: Waterborne Polyamide Epoxy Gloss Coating No. P42; 6.0 mils DFT.
      - 2) DC: 4426-XXXX Tru-Glaze-WB 4426 Waterborne Epoxy Semi-Gloss Coating; 7.0 mils DFT.
      - 3) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K45-150 Series; 3.0 mils DFT.
- E. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal. Primer is not required on shop-primed items, except steel doors and frames, which require a primer under this specification. Prime bare spots of ferrous metals.
1. Semigloss, Water Based Alkyd Enamel Finish: 2 finish coats over a primer.
    - a. Primer: Quick-drying, corrosion resistant, single component, acrylic-modified alkyd primer or self cross-linking acrylic primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
      - 1) Moore: Advance Waterborne Interior Alkyd Primer No. 790; 1.6 mils DFT.

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- 2) DC: 4020-1000 Devflex 4020PF Direct to Metal Primer & Flat Finish; 3.0 mils DFT.
- 3) S-W: Pro Industrial Pro-Cryl Universal Primer B66-310 Series; 3.0 mils DFT.
- b. First and Second Coats: Semigloss, single component, acrylic-modified alkyd interior enamel or single-component, pre-catalyzed waterborne acrylic epoxy applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
  - 1) Moore: Advance Waterborne Interior Alkyd Gloss No. 794; 3.2 mils DFT.
  - 2) GP: 1506-XXXX Dulux Advanced Oil Interior/Exterior Semi-Gloss Wall & Trim Enamel; 4.0 mils DFT.
  - 3) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K45-150 Series; 3.0 mils DFT.
- F. Fire-Rating and Smoke Identification: Identify all 1, 2 and 3-hour fire-rated walls and partitions by stenciling rating on each side of rated walls above ceiling line with 4 inch high letters in red or orange semigloss paint; each rated wall shall be identified at least once and at a spacing not greater than 12 feet o.c. and not more than 5 feet from each end of the wall. Identify all smoke barriers and partitions by stenciling "SMOKE" on each side of walls above ceiling line with 4 inch high letters in bright green semigloss paint; each rated wall shall be identified at least once and at a spacing not greater than 12 feet o.c. and not more than 5 feet from each end of the wall.
  1. First Coat: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than indicated for product.
    - a. Moore: Ultra Spec 500 Interior Latex Semi-Gloss Finish No. N539; 1.8 mils DFT.
    - b. GP: 1416-XXXX Ultrahide Interior Latex Semi-Gloss Wall & Trim Enamel; 1.5 mils DFT.
    - c. S-W: ProMar 200 Interior Latex Semi-Gloss, B31W2200 Series; 1.5 mils DFT.

END OF SECTION 099000





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SECTION 102800 - TOILET AND BATH ACCESSORIES

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 toilet and bath accessories. Type of toilet and bath accessories includes, but is not limited to, the following:
  - 1. Toilet tissue dispensers.
  - 2. Towel bars.
  - 3. Robe hooks.
  - 4. Grab bars.
  - 5. Medicine cabinets.
  - 6. Mop and broom holder.
- B. Related Sections include the following:
  - 1. Division 06 Section "Rough Carpentry" for concealed wood blocking to support accessories.
  - 2. Division 22 Sections for fiberglass shower units with integral grab bars, folding seats, and shower rods.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- C. Shop Drawings: Include blocking locations and mounting heights identified.
- D. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- E. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use room and accessory designations indicated in the Toilet and Bath Accessory Schedule in Part 3 and room and accessory designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

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- B. Insofar as possible, fitting, construction and fabrication of the work shall be executed at shop, ready for delivery and erection at building.
- C. Provide all holes, connections, and fastenings for and to work of other trades abutting, adjoining or intersecting work of this Section.

#### 1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Coordinate location of recessed medicine cabinets and installation of sink vent piping.

### PART 2 - PRODUCTS

#### 2.1 TOILET ACCESSORIES

- A. Liquid Soap Dispenser, Wall Mounted (SD): Horizontally-mounted soap dispenser, container body and back Type 304 stainless steel, satin finish. Shall dispense liquid soaps, including foam, 40 fl. oz. capacity, unbreakable refill window, concealed wall fastening, large locked hinged stainless steel filler top, vandal-resistant.
  - 1. Products:
    - a. Bobrick Washroom Equipment, Inc.; Model B-2112.
    - b. Bradley Corporation; Model 6542.

#### 2.2 BATHROOM ACCESSORIES

- A. Toilet Paper Dispenser: Single-roll dispenser, thermoplastic-coated metal, recessed mounted with fasteners, noncontrol delivery with manufacturer's standard spindle capable of accepting a 4-1/2- or 5-inch- diameter-core tissue roll; color selected by Architect from manufacturer's full range of colors.
  - 1. Anchor Architectural Products, Paper Holder AH 060.
- B. Towel Bars: Thermoplastic-coated metal, 1-inch diameter with 3/16-inch thick flanges; concealed fastener mounting; color selected by Architect from manufacturer's full range of colors. Lengths indicated on Drawings.
  - 1. Length: 30 inches, unless indicated otherwise.
  - 2. Product: Anchor Architectural Products, Towel Bar/Grab Bar AH-515.
- C. Robe Hook: Double prong unit with 2-1/2 inch diameter mounting with concealed fasteners and projecting 1-3/4 inch from wall, thermoplastic-coated metal; selected by Architect from manufacturer's full range of colors.
  - 1. Product: Anchor Architectural Products, Double Robe hook AH510.
- D. Grab Bars: Bars shall be thermoplastic- coated steel, 1-1/4 inch diameter, minimum 0.064 inch wall thickness with 3/16-inch thick flanges; concealed fastener mounting; color selected by

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Architect from manufacturer's full range of colors. Lengths and configurations shall be as indicated on the Drawings.

1. Product: Anchor Architectural Products.

E. Swing-Up Grab Bar: Bars shall be thermoplastic-coated steel, 1-1/4 inch diameter, minimum 0.064 inch wall thickness with 3/16-inch thick flanges; concealed fastener mounting. Swing-up grab bar shall be manually raised for approach or departure and lowered to horizontal position for support; counterweighted design shall prevent grab bar from falling back down to full horizontal position once grab bar is raised to full upright (vertical) position. Grab bar shall comply with barrier-free accessibility guidelines for structural strength. Color selected by Architect from manufacturer's full range of colors.

1. Product: Anchor Architectural Products; Type U, Flip-Up Grab Bar.

## 2.3 MEDICINE CABINETS

A. Medicine Cabinets, Standard Resident Units: Recessed, single door, one-piece, injection-molded polystyrene cabinet with two adjustable polystyrene shelves; unit shall have a stainless steel framed mirror.

1. Size: 16 inches wide by 26 inches high.

2. Product: Broan-NuTone LLC; Styleline Series, Model B772193.

a. ADA Resident Units: 16 inches wide by 36 inches high.

## 2.4 FABRICATION

A. General: One, maximum 1-1/2-inch-diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. Sections and shapes shall be rolled, formed, drawn, or extruded as required for respective functions.

C. Molded work shall have sharply defined profile and shall be clean and straight. Plain work shall be leveled, straight and surfaces true and smooth. Edges, angles, and corners shall be square, clean and sharp, unless otherwise detailed.

D. Fastenings, exposed metal fastenings, and accessories, unless Underwriters prohibit for safety, shall be of same materials, texture, color and finish as the base metal to which applied.

E. Molds, trim, frames and other metalwork shall be proper dimensions to receive masonry block and tile, plaster, ceramic tile, or other scheduled finishes.

F. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

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PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab bars shall be screwed to solid wood blocking in stud partitions. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.
- C. Concealed Blocking: Provide concealed wood blocking, 3/4-inch thick plywood covering 32 inch by 32-inch area, in stud walls.

3.2 TOILET ACCESSORIES SCHEDULE

- A. Bathrooms:
  - 1. Provide on toilet tissue dispenser.
  - 2. Provide one robe hook.
  - 3. Provide one towel bar.
  - 4. Provide one medicine cabinet.
  - 5. Provide grab bars in configurations shown as indicated. Grab bars mounted on steel framed walls shall be screwed to solid wood blocking in stud partitions.

3.3 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

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SECTION 108500 - BUILDING SPECIALTIES

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. Cubical curtain tracks and curtains.
  2. Corner guards.
  3. Beauty Salon equipment.
  4. Door frame protection.
  5. Aquarium equipment.
- B. Related Sections include the following:
1. Division 06 Section "Rough Carpentry" for concealed blocking required to install building specialties.
  2. Division 11 Section "Residential Appliances" for residential washers and dryers.
  3. Division 22 Sections for gas, plumbing and venting connections for commercial laundry equipment and beauty salon shampoo sinks.
  4. Division 26 for conduit and wiring for and beauty salon equipment.

1.3 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittals Procedures."
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and method of attachment for each product indicated.
1. Include detailed information regarding rough-in and other preparatory work by other trades related to and beauty salon equipment installation.
  2. Include wiring diagrams and location of wiring connections for electrically operated projection screens.
  3. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.
- C. Shop Drawings: Show fabrication and installation details for each product specified. Shop Drawings shall indicate materials, gauges, fabrication details, dimensions and method of attachment.
- D. Samples: For each product involving a color selection, submit the manufacturer's color charts showing the full range of colors and patterns available.

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- E. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.
- F. Maintenance Data: For all items to include in Operating and Maintenance Manuals specified in Division 01 Section "Operation and Maintenance Data."
- G. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide corner guards with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

1.5 WORKMANSHIP

- A. Materials, devices, equipment and apparatus of a patented or of a special nature of manufacture shall be prepared, applied, or installed in strict accordance with the manufacturer's directions.
- B. Work of this Section shall be executed in strict accordance with Drawings, approved Shop Drawings and approved samples.
- C. Insofar as possible, fitting, construction and fabrication of the work shall be executed at shops, ready for delivery and erection at buildings.
- D. Provide all holes, connections, and fastenings for and to work of other trades abutting, adjoining, or intersecting work of this Section.
- E. All items, which do not have a special finish or are not otherwise specified, shall receive one shop coat of metal primer before leaving shop.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver commercial laundry equipment only after utility rough-in is complete and construction in spaces to receive appliances is ready for installation.
- B. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for metal locker installation.

1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

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- B. Corner Guard Special Warranty: Written warranty, signed by manufacturer agreeing to replace corner guard systems that do not comply with requirements or that have material or manufacturing defects within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for manufacturer and product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
  - 2. Product: Subject to compliance with requirements, provide one of the products specified.

### 2.2 CUBICAL TRACKS AND CURTAINS

- A. Cubical Tracks: Ceiling mounted tracks, 16-gage extruded aluminum, anodized or painted finish. Carriers shall be a non-binding, abrasion-resistant nylon block supported from self-lubricating bearings by two nylon wheels.
  - 1. Products:
    - a. Imperial Fastener co., Inc.; Model No. FC-98.
- B. Cubical Curtains: Construct curtains of Maharahm Healthcare Collection/4 inherently flame-resistant Trevira polyester, top hem of 1-1/2 inches wide with three thicknesses of fabric; integral webbing in top hem to insure proper gripping of the grommets; bottom hem 1 inch wide, triple thickness, and the side hems 1 inch wide with triple thickness of material. All vertical seams overlapped and sewn with a double needle, interlocked stitch to insure straightness and strength of seams; bottom hem sewing turned vertically at each corner to prevent unravelling of sewing thread; all sewing performed with lock stitch machines; grommets nickel-plated brass and machined into the top hem at 6 inch intervals; grommets firmly anchored into the triple thickness of the hem; hang curtains to within 15 inches above finished floor.
  - 1. Install curtain retainers at all walls where track terminates. Provide curtain tie-back consisting of vinyl strap and extruded aluminum retainer. Screw attach to concealed blocking in addition to adhesive strip.
  - 2. Color and Pattern: As selected by Architect from manufacturer's full range of options.

### 2.3 CORNER GUARDS

- A. Surface-Mounted Corner Guards: ASTM E 648, Class 1; fabricated from PVC; with formed edges; fabricated with 90-degree turn to match wall condition.
  - 1. Wing Size: 1-1/2 inches by 1-1/2 inches by 1/8- inch thick.
  - 2. Height: Partial height; coordinate with Drawings.
  - 3. Mounting: Adhesive.
  - 4. Colors: As selected by Architect from manufacturer's full range.
  - 5. Product: Johnsonite; Corner Bumper Guards, Model VBG-XX-A.
    - a. Adhesive: Johnsonite Contact Bond Adhesive No. 945.

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2.4 BEAUTY SALON EQUIPMENT

- A. General: Provide the following pieces of equipment as manufactured by Belvedere USA Corp.; subsidiary of Wella Corp.; (800) 435-5491.
- B. Styling Vanity: Right hand unit has three drawers; tip-out tool panel has holders for hand-held dryer, clipper and two large and one standard curling iron; laminate color as selected by Architect.
  - 1. Model: Kalli, Model KA127.
- C. Pivoting Backwash Shampoo Sink: High gloss, stain resistant, porcelain enameled, cast iron bowl with wall mounting bracket and flexible drain hose; provide fittings, spray, strainer, vacuum breaker and neck rest.
  - 1. Color: Selected by Architect from manufacturer's full range of colors.
  - 2. Model: Pivoting Bowl Series 8600.
- D. All-Purpose Chair: Fully upholstered back and seat with black urethane arms; locking back release mechanism; bright chrome foot rest; and bright chrome, round hydraulic base.
  - 1. Fabric: Grade 1 vinyl; color selected by Architect from manufacturer's full range of colors.
  - 2. Model: Riva All-Purpose Chair RV11 with RD12cC Base and 04ACF Footrest.
- E. Dryer Hood: UL listed unit equipped for front crown area and nape drying; extra large smoked hood with front-to-back and height adjustability; textured black finish dryer box; five-position heat control; sixty-minute timer; dust filter; and dryer cart.
  - 1. Model: Mega Dryer B900S with Dryer Cart 17009B.
  - 2. Provide two units.
- F. Styling Chair: Fully upholstered back and seat with black urethane arms; locking back release mechanism; bright chrome foot rest; and bright chrome, round hydraulic base.
  - 1. Fabric: Grade 1 vinyl; color selected by Architect from manufacturer's full range of colors.
  - 2. Model: Riva Styling Chair RV12 with RD12cC Base and 04ACF Footrest.
- G. Rollabout Vanity: Rolling vanity with large casters, two locking; two drawers with full extension slides and storage compartment with door, all with stainless steel pulls; quadraplex electrical outlet; and three satin aluminum bars on top.
  - 1. Laminate Color: As selected by Architect from manufacturer's stand options.
  - 2. Model: Kalli Rollabout, Model KA108.

2.5 AQUARIUM EQUIPMENT

- A. General: Provide the following pieces of equipment as manufactured by Marine Design; (800) 000-0000.
- B. Acrylic Aquarium: Seamless cylinder, 60 inches in diameter and 60 inches high; 750 gallon capacity with recessed lid.
- C. Stand: Steel stand constructed from 2 inch steel tubes.



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- D. Media: Wet-dry with bio.
- E. UV Sterilizer: In-line type.
- F. Pumps: Provide two Reeflo units.
- G. Protein Skimmer: Custom Bashsea twisted skimmer.
- H. Lighting: Provide three high output LED pendants.
- I. Insert: Provide reef insert for center overflow.
- J. Sand/Gravel: Bulk reef sand.

## 2.6 FABRICATION

- A. General: Materials shall be free from defects impairing strength, durability or appearance.
- B. Sections and shapes shall be rolled, formed, drawn or extruded as required for respective functions.
- C. Molded work shall have sharply defined profile and shall be clean and straight. Plain work shall be leveled, straight and surfaces true and smooth. Edges, angles, and corners shall be square, clean and sharp, unless otherwise detailed.
- D. Fastenings, exposed metal fastenings, and accessories, unless Underwriters' prohibit for safety, shall be of same materials, texture, color and finish as the base metal to which applied.
- E. Molds, trim, frames and other metalwork shall be proper dimensions to receive masonry block and tile, plaster, ceramic tile, or other applicable finishes and interfaces of adjacent construction.

## 2.7 DOOR FRAME PROTECTION

- A. Door Frame Protection: Two-piece frame protector fabricated from extruded rigid plastic, minimum 0.040-inch wall thickness; formed to fit entire door-frame profile.
  - 1. Height: Full height.
  - 2. Color and Texture: As selected by Architect from manufacturer's full range.
  - 3. Mounting: Adhesive.
  - 4. Product: Construction Specialties, Inc.; Door Frame Protector Model B1.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installers present, for compliance with requirements for installation tolerances, and other conditions affecting performance of work.

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- B. Examine roughing-in for electrical, ventilation, gas and plumbing systems to verify actual locations of piping and electrical connections before installation of commercial laundry equipment and beauty salon equipment.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. All items specified under this Section shall be installed in strict accordance with manufacturer's recommendations and approved Shop Drawings.

3.3 CLEANING AND PROTECTION

- A. Clean building specialties in accordance with manufacturer's instructions. Touch up factory-applied finishes to restore damaged or soiled areas.
- B. Provide final protection and maintain conditions that ensure building specialties are without damage or deterioration at the time of Substantial Completion.

3.4 DEMONSTRATION

- A. Training: Instruct Owner's personnel in proper use, operations, and daily maintenance of laundry equipment. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete commercial laundry equipment maintenance program. Coordinate instruction with the availability of the Owner's personnel.
- B. Make a final check of operation for each piece of commercial laundry equipment with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

END OF SECTION 108500

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SECTION 114000 – FOODSERVICE EQUIPMENT

PART I – GENERAL

1.1 SCOPE OF WORK

- A. Furnish equipment labor, materials and service necessary for the installation/assembly of foodservice equipment. This subcontractor shall be referred to as the Foodservice Equipment Contractor (FEC).
- B. FEC shall furnish required instructions for work to be performed by the General Contractors, Electrical, Plumbing and Mechanical sub-contractors in connection with requirements for all equipment under this section.

1.2 DEFINITIONS AND ABBREVIATIONS

- A. “INSTALL” as used in this section means to set in place, complete, secure, anchor and connect and in fully operational condition.
- B. “FURNISH” as used in this section means to supply and deliver to the project ready for installation and in operable condition.
- C. “PROVIDE” as used in this section means to supply all necessary material, labor and equipment to furnish and install for final connection by appropriate trades.

D. Abbreviations:

Above finished floor	AFF
American Gas Association	AGA
American Society for Mechanical Engineers	ASME
American Society for Refrigeration Engineers	
	A
RE American Society of Heating, Refrigeration and Air Conditioning Engineers	
	ASHR
AE Cubic Feet Per Minute	CFM
Duplex Convenience Outlet	DCO
Electrical Contractor	EC
Food Service Equipment Contractor	FEC
General Contractor	GC
Heating, Ventilation and Air Conditioning Contractor	HVAC
Mechanical Contractor	MC
National Electrical Manufacturers Association	NECA
National Fire Protection Association	NFPA
National Sanitation Foundation	NSF
Occupational Safety and Health Administration	OSHA
Plumbing Contractor	PC
Stainless Steel	S/S

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Temperature Differential	T.D.
Underwriters Laboratories	UL

1.3 RELATED DOCUMENTS AND SPECIFIED WORK BY OTHER CONTRACTORS

- A. The General Contractor (hereafter known as GC) shall provide the following based on Architectural and Foodservice drawings and specifications:
1. Floors and setting beds, quarry tile and base, masonry pads, protective curbing, walls and finished ceilings and related building work.
  2. Transit-level recessed, sub-floor, water proofing, floor depressions, wire cloth, concrete setting bed, floor tile and base, wearing floor and coved base, and related building work including cold storage rooms.
  3. Concealed wall backing to support all wall mounted equipment. (Drywall and stud type construction only).
  4. Install floor troughs furnished by the FEC.
  5. Provide and position roof curb ("railings") or concrete pad (if on the ground), per Architect's and Foodservice Drawings and details to meet local code and provide sleeves and or pitch pockets for conduit refrigeration piping, wiring, (also) per Architect and Foodservice details for walk-in cooler freezer condenser refrigeration systems.
  6. Coordinate location for sleeves, conduits, duct work and other through wall conductors with architect.
  7. GC shall coordinate with appropriate trade requirements for ducts, fans, dampers, starters, etc., necessary for the operation of all required exhaust and ventilation systems, as specified.
- B. The Mechanical Contractor (hereafter known as MC) shall provide the following:
1. All hood or ventilator duct work upstream from the duct opening to include collar welded connection and all rated connections. All permits including permit to hang the hoods.
  2. Provide ducts, fans, dampers, etc. as required for ventilation systems including exhaust hoods, unless otherwise noted. MC shall coordinate with appropriate trade requirements for ducts, fans, dampers, starters, etc., necessary for the operation of all required exhaust and ventilation systems, as specified.
  3. All labor, material and service required, verify size and location of duct connections.
- C. The Plumbing Contractor (hereafter referred to as PC) shall provide the following:
1. All water, waste, indirect waste piping from sinks and ventilators, steam and gas services to the equipment including all shut-off valves, plumbing trim, traps, gas pressure reducing and regulation valves for pressures above 14" W.C. for main gas supply and point of use gas regulators as required for each piece of gas fired foodservice equipment, grease traps and PVC conduit for beverage or refrigeration lines, etc. and final connections to the equipment except as specified herein shall be provided by the Plumbing Contractor.
  2. Installation shall be in accordance with the codes in effect at the job site. Piping shall run as described hereafter, and shall discharge into open-site drains and floor sinks. Extend piping to a point at least 2" above the rim for the drain/floor sink and with a cut bottom on 45 degree angle. All indirect waste piping shall be installed and

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- routed in a manner to ensure proper drainage and shall conform with shelves, spaces, equipment or building conditions. Secure all indirect waste piping as required to achieve same. Indirect waste piping from ice bins, ice pans or similar items shall be insulated and installed to prevent condensation.
3. Ensure proper clearance for cleaning, all horizontal piping lines shall be run at the highest possible elevation and not less than 6" above the finished floor, and through equipment whenever possible.
  4. Suitable pipe slots, chases and/or do all drilling, punching and cutting of equipment required to provide access for appropriate trade to make connections and/or runs. Such work performed at the job site shall be of the same quality as similar to the factory or fabrication shop. PC shall provide a stainless steel cover chase or chrome-plated piping and fittings when exposed to the public eye.
  5. Assemble, mount and connect all faucets, pre-rinse spray assemblies, lever wastes, drains, vacuum breakers, flow control valves, check valves, water inlets, traps, filters, pressure reducing valves, strainers, temperature/pressure gauges, gas valves, flexible gas hoses, gas pressure regulators, etc. Provide special care in installation to eliminate tool marks from installation.
  6. All eye wash stations, emergency showers, floor sinks, mop sinks, hose bibs and floor drains (unless otherwise noted by owner).
  7. Piping sleeves for refrigeration and drain lines through building walls and floors.
  8. Cooler/Freezer condensate drain line piping. Trap line(s) outside of box above drain to hold 2 inches of water so air cannot be drawn into walk-in box.
  9. Final connection of the recirculating and municipal water to refrigeration equipment, as specified.
  10. Make plumbing connections between sections of modular equipment such as utility distribution system, exhaust hoods, remote refrigeration systems or walk-in coolers and freezers.
  11. All grease traps (unless other wise indicated by owner) and make final connection.
  12. Confirm and assure trough and disposer cone water inlets shall be located above positive water level to prevent siphoning of liquids in the water systems. Wherever conditions shall require a submerged inlet, a suitable and code approved back flow device such as a reduced pressure backflow, check valve and vacuum breaker shall be placed on the fixture to form part of the same to prevent siphoning. Include ¼ turn valves for each of the water inlets to control water volume.
- D. The Electrical Contractor (hereafter referred to as EC) shall provide the following:
1. All electrical services and components including wiring to and final connections to all equipment except as specified herein including rough-in and final connections for all services. Make electrical connections between sections of modular equipment such as utility distribution system, exhaust hoods, remote refrigeration systems or walk-in coolers and freezers.
  2. Connect and install electrical devices furnished by the FEC.
  3. Receptacles, conduit, contactors, controllers, switches, disconnects, starters, etc. unless otherwise indicated.
  4. Conduit to and within cold storage rooms in cooperation with the FEC. Wire from all compressor timers to evaporators coils as indicated on the schedule. Wire to all remote condensers or packaged refrigeration systems. Wire to all components of

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the walk-in cooler and freezer including door assemblies, power door openers, lights, switches, condensate line heater outlets, heated air vents and audio/visual alarms. This must be done before FEC's refrigeration contractor can start the system.

5. Provide main power lines to foodservice refrigeration systems control panel and wiring for controls/defrost heaters between panels and coils according to factory supplied diagrams and local codes.
6. Connection of light fixtures provided by the FEC in cold storage/walk-in rooms.
7. Connection of cold storage rooms temperature alarm systems to the building security system.
8. Grounding type receptacles for all wall mounted outlets to be used for plug-in equipment.
9. Shunt trip breakers as indicated and/or required by code.
10. The FEC will provide all outlets, switches, controls, service fittings and load centers indicated on the foodservice drawings and specifications for all fabricated equipment. Load centers shall be complete with individual "visi-trip" circuit breakers for each device built in for forming an integral part of the unit.
11. Ensure that all conduits/wiring shall be run concealed wherever possible. Conduit shall be continuous from outlet and from outlet to load center or pull boxes and shall enter and be secured in such a manner that each system shall be electrically continuous throughout. All conduits shall be thoroughly and substantially supported by accepted industry practices.
12. All incandescent bulbs and fluorescent tubes required for equipment under this section are provided by others.

1.4 OWNER / PURVEYOR FURNISHED EQUIPMENT

- A. Obtain and coordinate manufacturer and model number not less than 120 days before equipment is required.
- B. Obtain and coordinate utility requirements.

1.5 REGULATIONS

- A. All FEC work and materials shall be in accordance with the latest rules, codes and/or regulations of agencies/authorities having jurisdiction. Furnish all foodservice equipment-related permits (at an additional charge), approvals and installation as required.
- B. All regulations, including building codes and other codes applying to this jurisdiction should be followed. In addition all equipment shall comply with the following:
  1. National Electric Manufacturer's Association (NEMA).
  2. Underwriter's Laboratories, Inc. (U.L.), and must bear label.
  3. National Electric Code, (NEC).
  4. National Sanitation Foundation, (NSF) and must bear label.
  5. American Society of Mechanical Engineers (ASME) and must carry the ASME stamp.
  6. American Gas Association (AGA).
  7. National Fire Protection Association (NFPA) including #54, 70 and 96.
- C. Ruling and interpretations of the enforcing agencies shall be considered a part of the regulations.

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1.6 WARRANTY

- A. FEC shall provide all standard manufacturer's warranties including labor, materials, refrigerant and incidental expenses to maintain proper operation of all related equipment. Any parts requiring replacement during warranty period shall be replaced with new parts and installed at no cost to the Owner.
- B. Equipment shall be serviced within a reasonable period of time by a competent and factory-trained local service agency. Scheduled maintenance must be performed per the manufacturer's recommendations by the owner operator at their cost.
- C. A pro rata basis extension shall be included for the condensing units for four (4) additional years, exclusive of labor.

1.7 SUBMITTALS

A. Product Data

- 1. After award of contract and before proceeding with the purchase of manufactured equipment, FEC shall submit one (1) specification book consisting of:
  - a. Hard three ring Binder including the name of the project.
  - b. Provide a specifications sheet for each manufactured piece of equipment showing: Item number, quantity, description, manufacturer's name and telephone, model number, optional finishes, equipment, accessories and modifications, utilities required and special notes.
- 2. Submit 1/4" scale rough-in drawings for review. Drawings shall be dimensioned, showing ventilation requirements, floor and wall sleeves, plumbing, gas, steam, and electrical connections, including those items supplied by the Owner. Provide concrete pad dimensions, depressions and special conditions as required for equipment. Elevations and sections of special work shall be prepared for use by the respective trades. Consultant shall comment and stamp drawings and return to FEC for duplication. Provide an adequate number of drawings as directed by the GC or Owner.
  - a. The following shall each be drawn on separate sheets and/or plans: Plumbing; Electrical; Building Works; Ventilation; and Refrigeration.
  - b. Utilities shall be stubbed out of walls by PC and EC whenever possible.
  - c. GC, PC, EC and MC shall verify mechanical, plumbing, electrical, and ventilation rough-in and sleeve locations are per the foodservice drawings before floor slabs are poured and dry wall installed.
  - d. In the event rough-in has been accomplished before the award of the contract, FEC to check existing facility and furnish all equipment to suit building conditions and utilities. If inspection reveals that the existing conditions seriously interfere with the execution of the Work, the FEC shall report these conditions to the Architect, GC and Owner and await instruction before proceeding with that portion of the work.
- 3. FEC shall have manufacturers prepare and submit shop drawings for all custom (special) items of work included in this contract. The detail drawings shall be submitted at minimum of 1/2" scale for elevations and 1-1/2" scale for sections.

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4. FEC shall review submittals before ordering equipment or starting fabrication. Red line corrected shop drawings will be returned to the manufacturer by the FEC.
5. All alternate manufacturer and equipment requests must be made in writing to Architect at least 10 days prior to bid due date.

1.8 PARTS AND SERVICE WARRANTY

Prior to demonstration and final inspection the FEC shall submit two (2) copies of the Operations and Maintenance manuals to the owner or owner designated party. Manuals shall be in electronic format.

1.9 VERIFICATION AND COORDINATION OF PROJECT / DATA

- A. FEC shall verify sizes with the Owner on the following items before ordering or fabrication:
  1. Steam pans
  2. Sheet pans
  3. Trays
  4. Glass and cup racks
  5. Plates
- B. FEC together with the GC and Architect shall verify all conditions at the building site(s), particularly door openings and passageways to avoid delivering items too large for entry. Coordinate with the GC access to insure delivery of equipment to the required areas.
- C. GC shall verify and coordinate with trades, the height and location of piping and duct work in areas above exhaust hoods and cold rooms.
- D. FEC and GC shall coordinate the timely installation of the wearing floors inside the cold storage rooms to prevent prolonged exposure of the curing floor acids walk-in panel skin. FEC shall notify trades that cold storage areas are not to be used by any other trades for storage or work areas. FEC shall see that whoever causes damage to the walk-in box repairs or replaces said damage accordingly before Owner occupancy.
- E. The Architect is responsible to indicate exactly where on the roof the remote refrigeration condensers are to be placed. The GC shall construct the condenser pad / rails and roof sleeves to meet all codes national and local. The FEC shall confirm the acceptability of the location of the remote refrigeration condensing units in regards to ambient temperature, noise, vandalism and accessibility. If the condensing unit location is determined to be unacceptable for any reason, FEC will advise Architect and Owner and require direction in writing.

PART II – PRODUCTS

2.1 COMMERCIAL MANUFACTURED EQUIPMENT

- A. Manufacturer's directions shall be followed in cases where the manufacturer of articles used in this contract furnishes direction or covers points not shown on the drawings or



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specifications.

- B. All doors shall be hinged as shown on the drawings.
- C. All exhaust hoods and cold storage rooms are to be manufactured as per the contract foodservice drawings.

### PART III – EXECUTION

#### 3.1 DELIVERY AND INSTALLATION

##### A. Delivery

FEC shall assure that the equipment will be delivered and installed on schedule. FEC shall coordinate all work with the General Contractor and other divisions as required.

##### B. Installation

###### 1. General

- a. The FEC shall assure that kitchen installation work will be accomplished so as not to delay the project construction schedule, interfere or conflict with the work being performed by other contractors. Work shall be coordinated and integrated to prevent conflict of work being performed by other contractors. Should conflicts occur, FEC shall notify the Owner for coordination in its resolution.
- b. FEC working the GC will verify "Building Readiness" and all required field dimensions before starting installation.
- c. GC will provide use of dumpster for disposal of packaging materials
- d. FEC will remove daily all debris from the site related to this installation, break down and place in GC's dumpster.

###### 2. Cold Storage Rooms

- a. The FEC shall arrange that the cold storage rooms shall be delivered and installed as shown on the shop Drawings. Shall coordinate work with the GC as necessary.
- b. FEC shall provide the necessary job site coordination with the various trades to insure job site conditions will meet the building readiness requirements of the cold storage rooms.
- c. GC shall make every effort during curing and cleaning of the wearing floor inside the cold storage rooms, the doors shall be removed or blocked open and the rooms well ventilated to prevent damage to the interior. "KEEP OUT" signs shall be posted at each open door. Fan should be placed inside the box exhausting air out of the doors.
- d. After the installation of the cold storage rooms and prior to the installation of the wearing floor and after the wearing floor has cured, the doors are to be closed and locked. Verify the door perimeter heater strip has not been activated and the circuit will remain off until the refrigeration system has been started.

###### 3. Refrigeration Systems

- a. Refrigeration systems and connecting piping shall be installed as indicated in contract documents in a manner that provides complete and operational systems and eliminates any noise and vibration being transmitted to any part of the building.

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- b. Piping shall be installed to permit normal installation, service, removal of the condensing units and their components and view sight glasses and allow expansion and contraction without damage to the systems.
  - c. Extreme care shall be taken to keep the entire system clean and dry.
  - d. Nitrogen gas shall flow through piping being welded to prevent scaling.
  - e. All refrigeration lines shall be factory extended to one end of the compressor rack in a neat and orderly manner and shall be supported and anchored with "Unistrut" or equal clamps and channels. Ends of lines shall be capped against contamination.
  - f. Compressors and all accessories on the compressor rack shall be factory mounted and pre-wired to a main circuit breaker control panel and with individual circuit breakers wired to a main breaker disconnect requiring a single power connection. All wiring shall be run inside a code approved raceway.
  - g. If in the opinion of the FEC, additional ventilation is required to ensure correct operation temperatures, the FEC shall so state in a letter to Owner.
4. Refrigeration Piping Testing
- a. Each system shall be pressure tested for leaks. The test for R-404a refrigeration shall be 250 PSI on the high side and 150 PSI on the low side. All valves shall be fully opened during the test.
  - b. Test to be accomplished as follows:
    - 1) Charge the systems with refrigerant through the port of liquid shut off valves of the receivers to a pressure of 10 to 20 PSI.
    - 2) Add dry nitrogen, the supply of which shall be equipped with pressure regulating valve to provide the specified pressure.
    - 3) Carefully test all points for leaks using either a Halide torch or an electric Halogen leak detector.
5. FEC shall be responsible for the ordering of all materials and installation of the UL 300 Listed fire suppression system in the exhaust hood. The local Fire Suppression contractor's agent, upon completion, will certify the system. The local Fire Suppression's contractor's agent, at the request of the local Fire Marshall, performs any special test firing for an added charge.

### 3.2 START-UP AND DEMONSTRATION

- A. All equipment under this section FEC shall have assembled and put in place and readied for test firing. The GC is responsible to clean equipment per the manufacturer's operations manual and ready it for demo and use.
- B. Refrigeration System Start-Up
  - 1. Charge each system with the refrigerant listed on the "approved" refrigeration shop drawings.
  - 2. All systems and controls shall be set and checked for proper operation temperature.
  - 3. Check compressor for proper oil level. Refrigeration oil shall be Suniso 3G, inhibited only, delivered to the job site in sealed containers. Oil shall be added to the system to maintain ¼" to ½" sight glass.
  - 4. Check all electrical circuits by Division 16 for compliance with the manufacturer's specifications. Division 16 shall make corrections to wiring as required.
  - 5. The manufacturer's requirement for lubrication shall be checked and followed before the operation of fan and pump motors, and/or associated equipment.



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**ITEM #3 TOASTER, SLOT-TYPE**

Quantity: One (1)

Manufacturer: Hatco

Model: TPT-208

1. Pop-Up Toaster, (4) 1-1/4" wide self-centering slots, individual toasting controls, removable crumb tray, stainless steel construction
2. 208v/60/1-ph, 2700w, 12.5 amps, 6' cord w/NEMA 6-15P

**ITEM #4 STAINLESS STEEL COUNTERTOP**

Quantity: One (1)

Manufacturer: Nationwide Fabrication, Inc.

Model: WRK-TBL-M

1. 43" L x 37" W x 24" H custom fabricated stainless steel Mobile Work Table as shown per A613 with the following features:
2. Top, 18"H Backsplash to be constructed of 304 series, 14 gauge stainless steel
3. Construct integral to higher counters on each side.
4. Legs to be constructed of 304 series, 16 gauge x 1-5/8" Dia. stainless steel tubing; stainless steel bullet feet.
5. Unexposed reinforcement to be 14 gauge galvanized channel; exposed reinforcement to be 14 gauge stainless steel channel
6. NSF seal applied.
6. Coordinate locations of utility lines to proposed equipment.

**ITEM #5 Countertop Hot Plate**

Quantity: One (1)

Manufacturer: Garland

Model: GTOG12-2

1. 2 burner gas hot plate
2. 11 11/16"W x 32"D x 13"H
3. 60,000 BTU natural gas

**ITEM #6 COUNTERTOP GRIDDLE**

Quantity: One (1)

Manufacturer: Garland

Model: GTGG24-GT24M

1. 23-5/8" W x 32" D x 13" H
2. Thermostat Controlled Standard Griddle
3. 56,000 Total input BTU Natural Gas

**ITEM #7 STAINLESS STEEL COUNTERTOP**

Quantity: One (1)

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Manufacturer: Nationwide Fabrication, Inc.

Model: WRK-TBL-M

1. 37"L x 32"W x 36"H custom fabricated stainless steel Mobile Work Table as shown per a613 with the following features:
2. Top, 6"H Backsplash to be constructed of 304 series, 14 gauge stainless steel
3. Legs to be constructed of 304 series, 16 gauge x 1-5/8" Dia. stainless steel tubing; stainless steel bullet feet.
4. Unexposed reinforcement to be 14 gauge galvanized channel; exposed reinforcement to be 14 gauge stainless steel channel
5. NSF seal applied.

**ITEM #8 FREEZER, UNDERCOUNTER, COMPACT**

Quantity: Four (1)

Manufacturer: Delfield

Model: UC4532N

1. Under counter Freezer Base, Front-Breathing, single-section, 32" W, 8.8 cubic feet, (1) door, (1) 1/1 GN shelf, stainless steel top, front & sides, ABS interior, 3" casters, front-breathing rear-mounted refrigeration system, 1/5 hp, cUL, UL, NSF
2. Four (4) 115v/60/1-ph, 9.5 amps, NEMA 5-15P, standard
3. Four (4) Self-contained refrigeration, standard
4. Four (4) Model 0420104 Door lock, original order only, not field installable, per door (not available on glass doors)
5. Door hinged right

**ITEM #9 OVEN, MICROWAVE**

Quantity: One (1)

Manufacturer: Sharp

Model: R-21LCF

1. Microwave Oven, 1000 watts, s/s door, timer panel & cavity, grey steel outer wrapper, durable side-hinged see-thru door, 6 minutes manual dial timer, timer heating-time guide, timer resets to 0 when door is opened during cooking cycle, 120v/60/1-ph, 14 amp, NEMA 5-15P, NSF-4, UL

**ITEM #10 GLASS FRONT REFRIGERATOR / COOLER**

Quantity: One (1)

Manufacturer: True

Model: TS-23G

1. 1 glass door
2. 3 shelves
3. 27"L x 29 3/4"D x 78 3/8"H
4. 1/3 HP
5. 115/60/1 volt
6. 7.49 amp
7. 5-15P NEMA Config plug

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**ITEM #11                      HAND SINK & FAUCET**

Quantity:                      One (1)  
Manufacturer:                Aero  
Model: DIHS-5

1.        Stainless Steel handsink NSF Certified. 12" wide x 10" long x 5" depth. Faucet: Advance-Tabco model D1-1-5. Mounted integral to stainless steel counter.

**STAINLESS STEEL COUNTERTOP**

Quantity:                      One (1)  
Manufacturer:                Nationwide Fabrication, Inc.  
Model: WRK-TBL-M

1.        114"L x 32"W x 36"H custom fabricated stainless steel Mobile Work Table as shown per a613 FS121 with the following features:
2.        Top, 6"H Backsplash and right end splash to be constructed of 304 series, 14 gauge stainless steel
3.        Legs to be constructed of 304 series, 16 gauge x 1-5/8" Dia. stainless steel tubing; stainless steel bullet feet.
4.        Unexposed reinforcement to be 14 gauge galvanized channel; exposed reinforcement to be 14 gauge stainless steel channel
5.        NSF seal applied.
6.        Installation of st st sink and faucet.

**ITEM #12                      ICE MACHINE & DISPENSER**

Quantity:                      One (1)  
Manufacturer:                Follett Corporation  
Model: 7FS100AIWNFST00

1.        7 Series Ice & Water Dispenser, freestanding, integral air-cooled ice machine, Chewblet® compressed nugget ice, 125 lb. production/24 hours, 7 lb. storage capacity, stainless steel exterior, push button dispensing standard, no internal filter designed to serve up to 25 people, for use in applications with less than 400 mg/1 total dissolved solids in water (either naturally occurring or treated with reverse osmosis) (Completion of Qualification/Site Validation Form #5065 is strongly recommended prior to order)
2.        115v/60/1-ph, 5.0 amps, 8' cord & NEMA 5-15P, 15 MCA, standard

**ITEM #13                      WATER TREATMENT SYSTEM**

Quantity:                      Two (2)  
Manufacturer:                Terry  
Model: SM2

1.        ScaleMaster 2, designed to control scale forming water before entering ice machine or steam cooker, stand alone, connect to cold water feed line, quick disconnect fittings, (up to 6 months cartridge life, approximately 22,000 gallons), made in USA, NSF
2.        Model TFH20SYS Filter for Ice Makers up to 1400 lb - Includes, housing with built-in shut-off valve and filter life gauge. Also included are wrench, bracket and 5 micron carbon block cartridge. This system comes complete with all necessary equipment for superior filtration up to 7 gpm flow.

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Approx. filter life is 6 months. 1/2" male pipe thread for installation.

**ITEM #14 COFFEE BREWER - BY BEVERAGE VENDOR**

Quantity: One (1)

**ITEM #15 JUICE DISPENSER - BY BEVERAGE VENDOR**

Quantity: One (1)

**ITEM #16 SIDE BY SIDE REFRIDGERATOR**

Quantity: One (1)

Manufacturer: General Electric

Model: PZS25KSESS

1. 35 3/4" W x 29 3/4" D x 72" H
2. Stainless Steel finish
3. Integrated water, cubed ice & crushed ice

**ITEM #17 SELF SERVE CASE, REFRIGERATED, DROP-IN**

Quantity: One (1)

Manufacturer: Structural Concepts

Model: DO4816R

1. Impulse® Self-Service Refrigerated Drop-In Merchandiser, 50-1/8"L, curved open front, T-8 top light, solid rear panel, black interior & exterior, (2) glass ends, Breeze™ w/EnergyWise refrigeration system, NSF7
2. NOTE: 29" minimum entry door clearance required (w/out shipping skid)
3. NOTE: If GFCI is required, a GFCI breaker MUST be used in lieu of a GFCI receptacle
4. Breeze w/EnergyWise self-contained refrigeration system w/evaporator pan (front access) 5. 120v/60/1ph, 9.17 amps, cord w/NEMA 5-15P
6. NOTE: Compressor air intake from below counter and through front, counter configuration must allow air to be drawn in and discharged out the front

**ITEM #18 ELECTRIC RANGE**

Quantity: One (1)

Manufacturer: General Electric

Model: JB450RFSS

1. 5.0 cf ft oven
2. Stainless Steel Finish
3. Upfront ADA controls

**ITEM #19 EXHAUST HOOD/FIRE SUPPRESSION**

Quantity: One (1)

Manufacturer: Denlar

Model: 1030-FE-NSF

1. Refer to 1/FS122

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**ITEM #20     DISHWASHER**

Quantity:     One (1)  
Manufacturer: General Electric  
Model:         GDT580SSFSS  
1.             Stainless Steel finish

**ITEM #21     EXHAUST HOOD, TYPE I**

Quantity:     One (1)  
Manufacturer: Captive-Aire  
Model: CUSTOM  
1.             NFPA 96 compliant stainless steel commercial hood

END OF SECTION 114000



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SECTION 123560 - RESIDENTIAL 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. This Section includes the following:
  - 1. Wood-veneer-faced cabinets.
  - 2. Wood-veneer-faced vanity cabinets.
  - 3. Thermofoil-faced cabinets.
- B. Related Sections include the following:
  - 1. Division 06 Section "Architectural Woodwork" for custom fabricated cabinets; for solid-surfacing and custom plastic laminated countertops.
  - 2. Division 10 Section "Toilet and Bath Accessories" for medicine cabinets.
  - 3. Division 10 Section "Building Specialties" for Salon cabinets.
  - 4. Division 22 Sections for drop-in sinks and for plumbing fittings and venting connections.
  - 5. Division 26 Sections for conduit and connections installed in casework for residential appliances.

1.3 DEFINITIONS

- A. Exposed Surfaces of Cabinets: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.
- B. Semiexposed Surfaces of Cabinets: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Bottoms of wall cabinets are defined as "semiexposed."
- C. Concealed Surfaces of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed."

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each product specified.
  - 1. Cabinets.
  - 2. Cabinet hardware.

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- C. Shop Drawings: For cabinets and countertops. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, and cutouts for plumbing fixtures.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Cabinets: Obtain each type of cabinets through one source from a single manufacturer.
- B. Quality Standards: Unless otherwise indicated, comply with the following standards:
  - 1. Cabinets: KCMA A161.1.
    - a. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semiexposed location of each unit and showing compliance with the above standard.
  - 2. Plastic-Laminate Countertops: KCMA A161.2.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
- C. Field Measurements for Countertops: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 COORDINATION

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of casework.
- B. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 CABINET MATERIALS

- A. General:
  - 1. Hardwood Lumber: Kiln dried to 7 percent moisture content.
  - 2. Hardwood Plywood: HPVA HP-1.
  - 3. Particleboard: ANSI A208.1, Grade M-2.
  - 4. Medium-Density Fiberboard: ANSI A208.2, Grade MD.

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- B. Exposed Materials:
1. Exposed Wood Species: As indicated for each cabinet style.
    - a. Select materials for compatible color and grain. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
    - b. Staining and Finish: As selected by Architect from manufacturer's full range.
  2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
  3. Plywood: Hardwood plywood with face veneer of species indicated and back veneer of manufacturer's standard interior hardwood species.
    - a. Edge band exposed edges with solid-wood edging of same species as face veneer.
  4. Thermoformed Vinyl-Faced Panels: Medium-density fiberboard, milled to required shapes, with a thermoformed vinyl overlay applied in a vacuum or membrane press.
    - a. Color: As indicated for each cabinet product.
- C. Semiexposed Materials: Unless otherwise indicated, provide the following:
1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects. Same species as exposed surfaces.
  2. Plywood: Hardwood plywood with faces of manufacturer's standard interior hardwood species.
- D. Concealed Materials: Solid wood or plywood of any hardwood species, with no defects affecting strength or utility.

## 2.2 CABINET HARDWARE

- A. Pulls: Back-mounted decorative pulls.
- B. Hinges: Concealed European-style self-closing hinges.
- C. Drawer Guides: Epoxy-coated-metal, self-closing, full extension drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; 100 pound capacity.
- D. Drawer and Cupboard Locks: Cylindrical type, 5-pin tumbler and cam, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.
1. Product: CompX International, Inc.; Timberline deadbolt door locks; tall cabinets System 260.
  2. Provide barlock multipoint locks for tall cabinets.
  3. Provide minimum of 2 keys per lock and 6 master keys.
  4. Each room shall be keyed according to Owner's instructions. Provide on all drawers and doors in rooms indicated.
  5. Locks provided in this Section and locks provided in Division 06 Section "Architectural Woodwork" shall be the same; GC to coordinate.

## 2.3 WOOD VENEER FACED CABINETS

- A. Product: Armstrong World Industries, Inc.; Premier Series. Provide Universal Access (ADA accessible) cabinets at designated locations.

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1. Style: Arborcrest.
    - a. Species: Cherry.
    - b. Finish (Stain): Crystal Clear finish.
  2. Upgrade: Provide dovetail drawers with full extension drawer glides, upgraded end panels, and upgraded wood panels for all exposed locations.
  3. Door and Drawer Pulls: 80152-160SN.
    - a. Finish: Satin Nickel.
  4. Accessories:
    - a. ADA Sink Apron: Solid cherry stained to match cabinets, 6 inches wide by 3/4-inch thick.
      - 1) Product: Cabinet Filler, Model No. UF642.
    - b. ADA Sink, Sloped Panel: Cherry veneered panel stained to match cabinets, cut to indicated size for laminating to composite panel.
      - 1) Product: Short-Grain Panel, Model No. PLY42X96.
  5. Locations: All locations receiving manufactured casework, except as indicated otherwise.
- B. Face Style: Flush overlay; door and drawer faces cover cabinet fronts with only enough space between faces for operating clearance.
- C. Cabinet Style: Face Frame.
- D. Door and Drawer Fronts: Solid-wood stiles and rails, 3/4 inch thick, with solid raised center panel.
- E. Face Frames: 3/4-inch thick solid wood to match exposed species; stiles shall be 1-1/2 inches wide and rails shall be 1-3/4 inches wide.
- F. Exposed Cabinet End Finish: Wood veneer, exterior veneer to match cabinet species, interior veneer to be manufacturer's standard.
  1. Exposed cabinet ends shall include ends of cabinets exposed at knee spaces, open sink bases, and similar conditions.
- G. Cabinet End Construction: 1/2-inch- thick plywood.
- H. Cabinet Tops and Bottoms: 1/2-inch- thick particleboard , fully supported by and secured in rabbets in end panels, front frame, and back rail.
- I. Back, Top, and Bottom Rails: Hardwood plywood, interlocking with end panels and rabbeted to receive top and bottom panels. Back rails secured under pressure with glue and with mechanical fasteners.
- J. Base-Unit Back Panels: 1/8-inch- thick hardboard fastened to rear edge of end panels and to top and bottom rails.
- K. Drawers: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
  1. Join subfronts, backs, and sides with glued dovetail joints.
  2. Subfronts, Backs, and Sides: 5/8-inch-thick solid wood.

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3. Bottoms: 3/16-inch-thick hardwood plywood; inserted into dado in front, back and sides; glued and stapled to sides.

L. Shelves: 5/8-inch-thick particleboard.

M. Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.

N. Factory Finishing: Finish cabinets at factory. Defer only final touchup until after installation.

#### 2.4 THERMOFOIL FACED CABINETS

A. Product: Armstrong World Industries, Inc.; Premier Series as follows

1. Style: Mayfair.
2. Upgrade: Provide dovetail drawers with full extension drawer glides.
3. Door and Drawer Pulls: 80152-160SN.
  - a. Finish: Satin Nickel.
4. Accessories:
  - a. ADA Sink, Straight Apron and Sloped Panel: White thermofoil on composite panel. Solid cherry stained to match cabinets, 6 inches wide by 3/4-inch thick.
    - 1) Straight Apron: 6 inches wide.
    - 2) Sloped Panel: 24 inch panel.
    - 3) Product: Dishwasher End Panel, Model No. DWR6.
5. Locks: Provide manufacturer installed locks on cabinets in Meds Rooms.
6. Locations: Meds Rooms, Break Room, and Clean Laundry.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.
- C. Install cabinets and countertop level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten cabinets to adjacent units and to backing.
  1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c. with No. 10 wafer-head screws sized for 1-1/4 inch penetration into concealed wood blocking, or hanging strips.

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3.2 ADJUSTING AND CLEANING

- A. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean casework and countertops on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 123560