

PROJECT MANUAL – Volume 1 of 2

Western Slope Food Bank of the Rockies

BID PACKAGE #4 – ABOVE GROUND

100% Construction Documents

Issued: August 25, 2021

Architect's Project Number: 2108



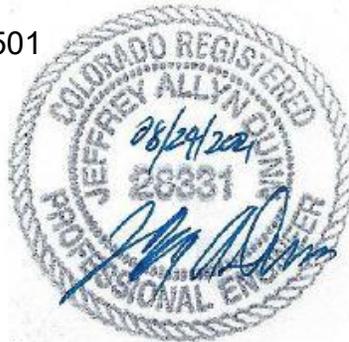
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STRUCTURAL ENGINEER:
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ELECTRICAL ENGINEER:
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TEAM DIRECTORY

Project Location

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Grand Junction, CO 81505

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SECTION 00 7000 - GENERAL CONDITIONS

PART 1 - GENERAL

- 1.1 The "General Conditions of the Contract for Construction," AIA Document A201, 2007 Edition, Articles 1 through 14 inclusive, is a part of this Contract, and is incorporated as fully as if here set forth.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 7000

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SECTION 00 7300 - SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

The following Supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction" AIA Document A201, 2007 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

Article 3: CONTRACTOR3.6.1 Sales and Use Taxes (Add)

Contractors shall be responsible for informing themselves of applicable tax laws, requirements, regulations, and interpretations as they apply to this project.

3.7.1 (Delete and replace with the following)

The Owner will pay for tap/connection fees for storm, sanitary sewer, power, gas, phones, TV and both domestic and fire system water. The Owner will also pay for any Community Development plan review fees and impact fees. All other fees, permits, and licenses will be paid for by the Contractor. The Architect will be responsible for the initial submittal of information to the authorities having jurisdiction, answering and responding to questions regarding design issues, and providing design clarifications necessary to obtain permits and approvals. The Contractor will be responsible for coordinating the applications, picking up licenses, approvals and permits and informing the Owner and Architect of any requirements from authorities having jurisdiction.

Article 7: CHANGES IN THE WORK7.3.3.3 After the word "fee", add the following:

"...of the itemized cost breakdown as follows:

Overhead and profit on burdened labor hours, itemized by skill or category: not to exceed 15%.

Overhead and profit on materials required, as verified by quantities and unit cost invoices, including applicable sales taxes, but deducting any trade discounts: not to exceed 10%.

Overhead and profit on fair rental value for power tools or equipment for additional time such are used in connection with the change, regardless of ownership, hours or days and rates: not to exceed 10%

Overhead and profit charged by Subcontractors or Sub-subcontractors on all subcontract work: not to exceed 10%."

7.3.7

First sentence, after "...an amount for overhead and profit as set forth in" add "Article 7.3.3.3." Delete "the Agreement, or if no such amount, a reasonable amount."

7.3.7.5 (delete paragraph, substitute)

Among items to be considered as included in overhead and profit and not as separate costs are: insurance premiums not listed above, superintendents, supervision, small or hand tools, time keepers, clerks, watchmen, subsistence, incidental job expenses and general office expenses.

Article 8: TIME8.3.4 (Added)

Time extensions will not be granted for rain, wind, snow, or other weather phenomena of normal intensity for the locality where work is performed. Determinations of the extent of delay attributable to unusual weather conditions shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climactic range during the same period on the calendar. National Oceanic and Atmospheric Administration National Weather Service statistics for the locality or area where the work is performed shall be used to determine the five (5) year average weather conditions.

Article 9: PAYMENTS AND COMPLETION9.2 (Add the following sentence)

The schedule of values shall be prepared in such a manner that each major item of Work and each subcontracted item of Work is shown as a single item on a form that is agreed upon by the Owner, Contractor and Architect.

9.3.1 (Add the following paragraphs)

The form of Application for Payment shall be agreed upon by the Owner, Contractor and Architect. Until the work is Substantially Complete, the Owner will pay 95% of the amount due the Contractor on account of progress payments, excluding the material cost of the Pre-Engineered Metal Building (PEMB) which will be paid in full.

9.10 Final Completion and Final Payments9.10.1.1 (Add)

If the work is completed, except for delay or correction of minor defects or unavailability of materials, or other causes beyond the control of the Contractor, the Owner, at his discretion, may release to the Contractor the remainder of the Contract Sum except for an amount equal to three times the cost of completing the unfinished work and/or correcting the defective work.

9.10.2.1 (Add)

Upon completion of the above and the requirements set forth in Division 01 "Closeout Procedures", the project shall be advertised in accordance with the Notice of Contractor's Settlement, by two publications of notice, the last publication appearing at least ten (10) days prior to the time of final settlement.

On the date of final settlement thus advertised, and after the Contractor has submitted a written notice to the Owner that no claims have been filed, final payment and settlement shall be made in full.

If any unpaid claim for labor, materials, supplies or equipment is filed before payment in full of all sums due the Contractor, the Owner shall withhold from the Contractor sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or in order for withdrawal signed by the claimant or his duly authorized agent or assignee. However, as provided by statute, such funds shall not be withheld longer than 90 days following the date fixed for final settlement with the Contractor, as set forth in the published notice of Contractor's Settlement unless such action at law shall be commenced within that time to enforce such unpaid claim and a notice of such action at law shall have been filed with the Owner. At the expiration of the 90-day period, the Owner shall release to the Contractor all monies as are not the subject of such action at law.

9.10.6 (Add)

Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any dispute, arbitration and/or litigation, and, subject to the provisions of this Article 9, the Owner shall continue to make payments to the Contractor in accordance with the Contract Documents.

Article 11: INSURANCE AND BONDS

11.1.1

In the first sentence, replace the word "jurisdiction" with the word "state."

11.1.1.9 (Added)

Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

Premises--Operations (Including X-C-U as applicable)

Independent Contractor's Protective

Products and Completed Operations

Personal Injury Liability with Employment Exclusion deleted.

Contractual--including specified provision for the Contractor's obligations under Paragraph 4.18

Owned, non-owned and hired motor vehicles

Broad Form Property Damage including Completed Operations

Umbrella Excess Liability

11.1.2.1 (Add the following Clause 11.1.2.1 to 11.1.2)

The insurance required by Subparagraph 11.1.1 shall be written for not less than the following, or greater if required by law:

1. Worker's compensation—Statutory
Employer's Liability: \$100,000
2. Comprehensive general liability, (including Premises-Operations; Independent Contractor's Protective; Product and Completed Operations; Broad Form Property Damage):
Combined single limits for bodily injury and property damage:
\$1,000,000 each occurrence and annual aggregate
Products and Completed Operations to be maintained for two years after final payment.
Property Damage Liability insurance shall provide X, C or U coverages.
3. Contractual Liability:
Bodily Injury: \$1,000,000 each occurrence and annual aggregate
Property Damage: \$1,000,000 each occurrence and annual aggregate
4. Personal Injury, with Employment Exclusion deleted: \$1,000,000 each person and annual aggregate
5. Comprehensive Automobile Liability: Combined single limits for bodily injury and property damage: \$1,000,000 each occurrence and annual aggregate

11.1.5 (Add)

Furnish one copy of Certificates herein required for each copy of the Agreement; specifically set forth evidence of all coverage required by Subparagraph 11.1.1, 11.1.2 and 11.1.3. The form of the Certificate shall be AIA Document G705. Furnish to the Owner, copies of any endorsements that are subsequently issued amending coverage or limits.

11.3 Property Insurance

11.3.1.6 (Added)

The form of policy for this coverage shall be "Completed Value." Provide policy in the broadest form available as of the Contract Document's date.

11.3.1.7 (Added)

If by the terms of this insurance any mandatory deductibles are required, the Contractor shall be responsible for payment of such mandatory deductibles in the event of a paid claim. Should the Owner elect to increase any mandatory deductibles or purchase deductible not otherwise required, he shall be responsible for payment of such additional deductible amounts. The amount of the mandatory deductible provision is \$1,000 per occurrence.

11.3.6 (Delete the first sentence and substitute following)

The Owner shall file a certificate of insurance for all policies including insurance coverages required by Paragraph 11.3.1. with the Contractor before an exposure to loss may occur.

Article 13: MISCELLANEOUS PROVISIONS

13.5.2 (Add the following)

Should such special testing, inspection or approval be caused by the Contractor's failure to follow requirements of the Contract Documents or by required tests per 4.2.6 indicating conditions not in conformance with Contract Documents, the costs of such additional testing, inspection or approval shall be borne by the Contractor regardless of the results.

Article 15: CLAIMS AND DISPUTES

15.1.5.2 (Add the following sentences)

Claims for time delays due to unusual weather conditions will be evaluated on a tentative basis until the project is substantially complete. At Substantial Completion actual weather conditions prevailing throughout the entire contract period will be considered in approving time extension due to weather delays. Time extensions for weather delays do not entitle the Contractor to "extended overhead" recovery.

15.3 (Delete 15.3 - Mediation and substitute the following)

Any claim, dispute or other matter in questions may be resolved in any manner permitted by law.

15.4 (Delete 15.4 – Arbitration)

END OF SECTION 00 7300

SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Project information.
 - 2. Work covered by the Contract Documents.
 - 3. Access to site.
 - 4. Work restrictions.

1.2 PROJECT INFORMATION

- A. Project Identification: Western Slope Food Bank of the Rockies
 - 1. Project Location: 698 Long Acre Drive, Grand Junction, Colorado.
- B. Owner: Food Bank of the Rockies
- C. Architect: Chamberlin Architects, 437 Main Street, Grand Junction, CO 81501
- D. Construction Manager / General Contractor: Ford Construction, 560 25 Rd, Grand Junction, CO 81505.

1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

- A. The Work consists of the following:
 - 1. The Work includes: All work not included in Bid Package #1 – Metal Building, Bid Package #2 – Site, or Bid Package #3 – Foundations.

1.4 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period.

1.5 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.2 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. 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.

1.3 PROCEDURES

- A. Coordination: Modify 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. Execute accepted alternates under the same conditions as other work of the Contract.
- C. 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 #1, Clean Room

1. Base Bid: Stud walls, suspended ceiling, doors, windows and light fixtures at the Clean Room 141 shall be as shown on the drawings.
 2. Alternate: Walls and ceiling shall be 4" insulated metal panels furnished and installed by the refrigeration supplier. Walls separating the kitchen and lockers from the clean room will be as shown in the base bid, except no finish is required on the clean room side, see wall types. Light fixtures, doors and windows in the Clean Room shall be furnished and installed by refrigeration supplier. Refrigeration supplier is under separate contract.
- B. Alternate #2, Agency Cooler Insulated Slab: Not applicable, Alternate #2 was not accepted with Bid Package #3 Foundations.
- C. Alternate #3, Kitchen Cooler/Freezer Insulated Slab: Refer to Bid Package #3 for details.
1. Base Bid: Provide typical flush concrete floor slab per structural drawings with recessed area at Freezer to receive insulated panel by refrigeration supplier.
 2. Alternate: Provide insulated floor slab at both Freezer and Cooler with structural slab recessed 9" to receive 4" of XPS insulation over vapor barrier with 5" topping slab. Provide thermal break between Freezer and Cooler as detailed on drawings.
- D. Alternate #4, Metal Building Roof Thermal Blocks
1. Base Bid: Install batt insulation compressed between roof panels and metal building girts as shown on drawings, except omit thermal blocks.
 2. Alternate: Add thermal blocks under roof panels, minimum R-3.5, refer to detail for Typical Roof Assembly at PEMB, on A141.

END OF SECTION 01 2300

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 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.
 - 4. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.2 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

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.
- B. 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.

- C. 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.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
 3. Number of Copies: Submit electronic copies through project management website established by Owner.
 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at

Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

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.

1.6 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 (3) 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 fifteen (15) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

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

- l. Construction waste management and recycling.
 - m. Parking availability.
 - n. First aid.
 - o. Progress cleaning.
 3. Minutes: Record and distribute meeting minutes.
- 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. Related RFIs.
 - c. Related Change Orders.
 - d. Submittals.
 - e. Review of mockups.
 - f. Possible conflicts.
 - g. Compatibility problems.
 - h. Time schedules.
 - i. Weather limitations.
 - j. Manufacturer's written recommendations.
 - k. Warranty requirements.
 - l. Compatibility of materials.
 - m. Acceptability of substrates.
 - n. Regulations of authorities having jurisdiction.
 - o. Testing and inspecting requirements.
 - p. Installation procedures.
 - q. Coordination with other work.
 - r. Protection of adjacent work.
 - s. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals, or longer intervals when agreed upon by Owner and Architect. Coordinate dates of meetings with preparation of payment requests.
 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in

- planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Sequence of operations.
 - 2) Status of submittals.
 - 3) Progress cleaning.
 - 4) RFIs.
 - 5) Status of proposal requests.
 - 6) Pending changes.
 - 7) Status of Change Orders.
 3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.

3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A or Contractor's form with information listed above.
1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven (7) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.

- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B or Contractor's form Including the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 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.

1.3 SUBMITTAL PROCEDURES

- A. Provide Product Data for all products indicated in Construction Documents and as indicated in individual product sections of the Specifications.
 - 1. Provide Shop Drawings of all fabricated products and as indicated in individual product sections of the Specifications.
- B. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided upon request by Architect for Contractor's use in preparing submittals. The Architect's electronic file waiver must be signed and returned prior to delivery of electronic files.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - b. No extension of time will be allowed because of failure to properly coordinate and sequence submittals.
- D. 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 fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow twenty-one (21) days for initial review of each submittal including:
 - a. Structural, Mechanical, Plumbing and Electrical submittals.
- E. Color Review and Approval: The Color Schedule in the Drawings indicate the initial color selections for the project. Because of the potential for product substitutions and discontinuation of colors, final color selections will be made by the Architect only after all color submittals have been received from the Contractor.**
1. Within seven (7) days after receipt of the final color submittal, the Architect will issue a Final Color Schedule to the Contractor in the form of an ASI to modify the color schedules in the Construction Documents.
- F. Identification: Place a permanent label or title block on each submittal for identification.**
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space 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. 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).
 - f. Number and title of appropriate Specification Section.
- G. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.**
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.**
1. Transmittal Form: Use AIA Document G810, CSI Form 12.1A or Contractor's standard transmittal form.

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.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "No Exceptions Taken" or "Make Corrections Noted".
 - J. 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.
 - K. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 1. Submit electronic submittals directly to extranet specifically established for Project.
- 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. Compliance with specified referenced standards.
 - h. Testing by recognized testing agency.
 4. Submit Product Data before or concurrent with Samples.
 5. Number of Copies: Submit three (3) copies of Product Data, unless otherwise indicated. Architect will return two (2) copies. Mark up and retain one returned copy as a Project

Record Document. Electronic submittals are preferred in lieu of hard copies unless specifically noted otherwise.

- 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. Design calculations.
 - e. Compliance with specified standards.
 - f. Seal and signature of professional engineer if specified.
 - g. 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 24 by 36 inches.
 3. Number of Copies: Submit three (3) opaque copies of each submittal, unless copies are required for Structural, Mechanical, Electrical or Plumbing Engineers, in which case submit four (4) copies. Two (2) copies will be returned. Electronic submittals are preferred in lieu of hard copies unless specifically noted otherwise.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. 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 two (2) sets of Samples. Architect will retain one (1) Sample set and return one (1).
 - 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 two (2) sets of paired units that show approximate limits of variations.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two (2) 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. 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.
- C. 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.
- D. 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.
- E. 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.
- F. 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.

- G. 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.
- H. 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.
- I. 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.
- J. 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.
- K. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

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.
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 two (2) 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.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S/ ACTION

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

END OF SECTION 01 3300

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SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 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.

1.2 DEFINITIONS

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

- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. 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.
- J. 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.

1.3 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 appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 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. 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. Description of the Work and test and inspection method.
6. Complete test or inspection data.
7. Test and inspection results and an interpretation of test results.
8. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
9. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
10. Name and signature of laboratory inspector.
11. Recommendations on retesting and reinspecting.

1.5 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. 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.
- G. 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.
- H. 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.
 - 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.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect 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.

1.6 TESTING SCHEDULE

- A. Testing paid by Owner: not applicable.
- B. Testing paid by Contractor:
 1. Fill and Backfill compaction density tests.
 2. Concrete Testing.
 3. Steel Testing.
 4. Mechanical systems balancing and testing.
 5. Electrical system testing.

1.7 QUALITY CONTROL

- A. **Owner Responsibilities:** Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. 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, and the Contract Sum will be adjusted by Change Order.
- 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. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 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.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

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 01 4000

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SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

- A. General: Unless otherwise indicated, cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer, Water, and Electric Power Service: Sewer, Water and Electrical Power Services will continue to be paid for by the Owner.

1.3 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.4 QUALITY ASSURANCE

- A. 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.

1.5 PROJECT CONDITIONS

- A. 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.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pavement: Comply with pavement Sections.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
- C. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry" or "Miscellaneous Rough Carpentry."
- D. Paint: Comply with requirements in Division 09 painting Sections.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.
 - a. Owner does authorize use of permanent HVAC system for use during construction.

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 by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION (Other than authorized use of Owner's utility services)

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. 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 that will not have a harmful effect on completed installations or elements being installed.
- D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service either overhead or underground.
 - 2. Connect temporary service to Owner's existing power source, as directed by Owner.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install at least one (1) telephone line(s) for each field office.
 - 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
 - 2. 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.
 - 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- G. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.
 - 1. Provide DSL in primary field office if available.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
 2. 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. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Provide temporary parking areas for construction personnel if there are no designated areas of Owner's existing parking.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. 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 properties nor endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- F. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
1. Provide temporary, directional signs for construction personnel and visitors.
 2. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

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.

1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

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.
 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.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. 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 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 specified in Division 01 Section "Closeout Procedures."

END OF SECTION 01 5000

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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.

1.2 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.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 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. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. 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.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - g. Cost information, including a proposal of change, if any, in the Contract Sum.
 - h. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 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.

1.5 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. 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.
 - 3. 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.

1.6 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. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 - 2. Refer to Divisions 02 through 49 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.
 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. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 3. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 4. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 5. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 6. 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. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
 7. 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. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
8. 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.
 9. 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.
 - 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. Timing: Architect will consider requests for substitution if received within sixty (60) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
1. Construction layout.
 2. Field engineering and surveying.
 3. General installation of products.
 4. Coordination of Owner-installed products.
 5. Progress cleaning.
 6. Starting and adjusting.
 7. Protection of installed construction.
 8. Correction of the Work.

1.2 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

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 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 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. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. 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.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. 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.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 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.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust 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."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

3.10 CORRECTION OF THE WORK

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

END OF SECTION 01 7300

SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Disposing of non-hazardous demolition and construction waste.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.3 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 Site Access and Temporary Controls:

- A. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycling is encouraged as much as possible. Recycle construction waste and packaging materials that are accepted by local facilities. Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste and transport to recycling receiver or processor.
- D. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- E. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 7419

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, 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, Final Completion construction photographs, damage or settlement surveys, property surveys, 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.
 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.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- 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.

1.3 FINAL COMPLETION

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

1. 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.
2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

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.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit one (1) copy 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. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
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.

1.5 WARRANTIES

A. Submittal Time:

1. 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.
2. Where commencement of warranties is the of Substantial Completion, submit warranties in electronic PDF format for review with the Operation and Maintenance Manuals (Section 01 7823).
3. Correct or modify warranties to comply with Architect's comments. Submit one (1) hard copy of each corrected manual and one (1) electronic copy in PDF format within fifteen (15) days of receipt of Architect's comments

B. Organize final warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. 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.
2. 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.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

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.
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. 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.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. 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.
 - j. Remove labels that are not permanent.
 - k. 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.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - q. 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.

- r. 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 01 7700

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SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for systems, subsystems, and equipment.
 - 2. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

1.2 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.

1.3 SUBMITTALS

- A. Final Submittal: Submit one (1) copy of each manual in electronic PDF format at least seven (7) days before final inspection. Architect will return copy with comments within fifteen (15) days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit one (1) hard copy of each corrected manual and one (1) electronic copy in PDF format within fifteen (15) days of receipt of Architect's comments.

1.4 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 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.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name, address, and telephone number of Contractor.
 6. Name and address of Architect.
- 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, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, 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.
 - 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.
 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. 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 bind envelopes in rear of manual. At appropriate locations in

manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

- A. Content: 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. Operating procedures.
 3. Wiring diagrams.
 4. Control diagrams.
 5. Piped system diagrams.
 6. License requirements including inspection and renewal dates.
- 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.
- 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. Instructions on stopping.
 5. Normal shutdown instructions.
 6. Seasonal and weekend operating instructions.
 7. 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.

2.3 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.
- 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. 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.

2.4 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.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 4. Aligning, adjusting, and checking instructions.
- 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. 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. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. 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.
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.
- C. 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.
- D. 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. 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."

- E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7823

SECTION 01 7839 - 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.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one (1) set(s) of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal: Submit one (1) set(s) of marked-up Record Prints. Architect will initial and date each print and mark whether general scope of changes, additional information recorded, and quality of markups are acceptable and legible. Architect will return prints for organizing into sets, printing, binding, and final submittal. Documents may be submitted electronically in lieu of hard copies.
 - b. Final Submittal: Submit one (1) set(s) of original marked-up Record Prints, and two (2) copies printed from Record Transparencies. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one (1) copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD 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. Revisions to electrical circuitry.
 - d. Changes made by Change Order or Construction Change Directive.
 - e. Changes made following Architect's written orders.
 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 record sets 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, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 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 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 and Record Drawings where applicable.

2.3 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.

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 01 7839

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SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 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. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. Maintenance service agreements and similar continuing commitments.
 - 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. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - 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.

1.7 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide 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 seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of [12] <Insert number> megapixels and capable of recording in full HD mode[with vibration reduction technology].
 - 1. Submit video recordings on a thumb drive or by uploading to web-based Project software site.

- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
- E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

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SECTION 03 3543 - POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Applying Sealer and Hardener, and polishing concrete to specified finish level.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of product requiring color selection.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Certification:
 - 1. Provide letter of certification from concrete finish manufacturer stating that installer is certified applicator of special concrete finishes and is familiar with proper procedures and installation requirements required by the manufacturer.
- B. Mock-ups:
 - 1. Apply mock-ups of each type finish, to demonstrate typical joints, surface finish, color variation (if any), and standard of workmanship.
 - a. Build mock-ups approximately 50 square feet in the location, as directed by the Architect or Owner Representative.
 - b. Approved mock-ups may become part of the completed work if undisturbed at time of substantial completion.
 - c. Include mockup of waxed area for vinyl graphics at sensory hall as noted on finish plans.
- C. Pre-Installation Conference:
 - 1. Conduct conference at project site to comply with requirements in Division 1 Section "Project Management and Coordination"

1.4 PROJECT CONDITIONS

- A. Environmental limitations:
 - 1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
 - a. Concrete Floor Flatness rating recommended at least 40, where possible.
 - b. Concrete Floor Levelness rating recommended at least 30, where possible.
 - c. Concrete must be cured a minimum of 45 days or as directed by the manufacturer before application of Retro Plate can begin.

- d. Application of Retro-Plate shall take place 10 days prior to installation of equipment and substantial completion, thus providing a complete, uninhibited concrete slab for application.
- B. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

A. HARDENING/SEALING AGENT

1. Retro-Plate 99, manufactured by Advanced Floor Products, Inc., P.O. Box 50533, Provo, Utah 84605, 801-812-3420 or architect approved equivalent.
 - a. Performance Criteria:
 - 1) Abrasion Resistance: ASTM C779 – Up to 400% increase in abrasion resistance.
 - 2) Impact Strength: ASTM C805 – Up to 21% increase impact strength.
 - 3) Ultra Violet Light and Water Spray: ASTM G23-81 – No adverse effect to ultra violet and water spray.
 - 4) Reflectivity: Up to 30% increase in reflectivity.
2. Certified Applicators as recommended by Manufacturer.

B. STAIN

1. No stain.

2.2 RELATED MATERIALS

A. Neutralizing Agent:

1. Tri-sodium Phosphate

B. Water:

1. Potable

PART 3 - EXECUTION

3.1 POLISHING

- A. Polish: Level 2: Satin (honed), 800 grit.
- B. Apply polished concrete finish system to cured and prepared slabs per manufacturer's written instructions.

1. Machine grind floor surfaces to receive polished finishes level and smooth. Expose aggregate to a “Salt and Pepper” appearance.
2. Apply reactive stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
3. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
4. Apply penetrating stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
5. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
6. Control and dispose of waste products produced by grinding and polishing operations.
7. Neutralize and clean polished floor surfaces.

3.2 PROTECTION

- A. Protect polished concrete floor against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated.
 1. Foot traffic only: Ram Board Floor Protection
 2. Equipment and/or ongoing work: Ram Board Floor Protection with ½” plywood or 7/16” OSB above.

END OF SECTION 03 3543

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SECTION 051200 - STRUCTURAL STEEL 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. Section Includes:

1. Structural steel.
2. Grout.

B. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
3. Division 05 Section "Metal Stairs."
4. Division 09 painting Sections and Division 09 Section "High-Performance Coatings" for surface-preparation and priming requirements.
5. Division 13 Section "Metal Building Systems" for structural steel.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches.
 2. Welded built-up members with plates thicker than 2 inches.
 3. Column base plates thicker than 2 inches.
- D. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

- E. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 - 5. Identify members and connections of the seismic-load-resisting system.
 - 6. Indicate locations and dimensions of protected zones.
 - 7. Identify demand critical welds.
 - 8. For structural-steel connections indicated to comply with design loads, include structural design data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).
 - 2. Electrode manufacturer and trade name, for demand critical welds.
- D. Qualification Data: For qualified professional engineer or testing agency.
- E. Welding certificates.
- F. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- G. Mill test reports for structural steel, including chemical and physical properties.
- H. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- I. Source quality-control reports.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator specializing in performing Work of this section with a minimum of three years experience in the fabrication of structural and miscellaneous steel for projects of similar scope and complexity. Fabricators without current A.I.S.C. certification must provide, at their own expense, special inspection of shop fabrication in accordance with I.B.C. Section 1704.2 and shall submit to the building official a certificate of compliance with the construction documents upon completion of fabrication. Fabricator is subject to the approval of the Owner, Architect, and Structural Engineer.
- B. Installer Qualifications: A qualified installer specializing in performing Work of this section with a minimum of three years experience in the erection of structural and miscellaneous steel for projects of similar scope and complexity. Steel erector is subject to the approval of the Owner, Architect, and Structural Engineer.
- C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- E. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 341 and AISC 341s1.
 - 3. AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- F. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half preconsumer recycled content is not less than the following:
 1. W-Shapes: 74%.
 2. Channels, Angles, S-Shapes: 60%.
 3. Plate and Bar: 25%.
 4. Cold-formed Hollow Structural Sections:
 - a. Columns: 74%
 - b. All other uses: 25%
- B. W-Shapes: ASTM A 992/A 992M .
- C. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M .
- D. Plate and Bar: ASTM A 36/A 36M.
- E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- F. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- G. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- C. Headed Anchor Studs (H.A.S): Meet requirements of AWS D1.1 Structural Welding Code, latest edition, Type B.
- D. Deformed Anchor Studs (D.A.S): Made from ASTM A-108 low carbon steel cold worked and deformed per ASTM A-496. Minimum yield stress = 60 ksi; minimum tensile strength = 80 ksi. Minimum bend diameters per ASTM A-496.
- E. Rebar: Rebar used for welding shall meet the requirements of ASTM A706. Rebar bends shall meet the minimum bend diameters listed in ACI 318, latest edition.
- F. Unheaded Anchor Rods: ASTM F 1554, Grade 36, 55, or 105 as indicated, weldable, hooked.
 1. Configuration: Straight Hooked.
 2. Nuts: ASTM A 563 heavy-hex carbon steel.
 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 5. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- G. Headed Anchor Rods: ASTM F 1554, Grade 36, 55, or 105 as indicated, weldable , straight.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- H. Threaded Rods: ASTM A 36/A 36M.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Washers: ASTM F 436, Type 1, hardened carbon steel.
 3. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- I. Expansion Anchors: Wedge type with current ICBO approval and published ICBO Research Report. Complete with required nuts, washers and Manufacturer's installation instructions. Size and Manufacturer as indicated on drawings.
 1. Provide galvanized or stainless steel anchors. Galvanized anchors shall conform to ASTM A133. Stainless steel anchors shall be Series 300 stainless steel bolts with Series 300 or Type 18-8 stainless steel nuts and washers.
 2. Where anchor Manufacturer is not indicated, subject to compliance with requirements and acceptance by the Contracting Officer, provide one of the following:
 - a. "Kwik-Bolt II" - Hilti Fastening Systems
 - b. "Parabolt" - Molly Fastener Group.

- c. Red Head Wedge Anchor" – Phillips
- J. Adhesive Anchors: Threaded carbon steel rod conforming to ASTM A307 complete with required nuts, washers, adhesive system and Manufacturer's installation instructions. Current ICBO approval and published ICBO Research Report required. Size and Manufacturer as indicated on drawings.
 - 1. Provide galvanized or stainless steel anchors. Galvanized anchors shall conform to ASTM A153. Stainless steel anchors shall be Series 300 stainless steel threaded rods with Series 300 or Type 18-8 stainless steel nuts and washers.
 - 2. Where Anchor Manufacturer is not indicated, subject to compliance with requirements and acceptance by the Contracting Officer, provide one of the following:
 - a. "HVA Adhesive Anchor" - Hilti Fastening Systems
 - b. "Parabond Capsule Anchor" - Molly Fastener Group
- K. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- L. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- M. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.3 PRIMER

- A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
 - 1. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - a. Anti-Corrosive and Anti-Rust Paints Applied to interior Ferrous Metals: VOC not more than 250 g/L.

2.4 GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning, SSPC-SP 2, "Hand Tool Cleaning, or SSPC-SP 3, "Power Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.
- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces not exposed to view and protected from moisture.
 - 3. Surfaces to be field welded.
 - 4. Surfaces to be high-strength bolted with slip-critical connections.
 - 5. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 6. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.
 2. For AESS, If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.

- F. Do not use thermal cutting during erection unless approved by Architect and Structural Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- I. Composite Beam Shear Studs Connectors: Locate shear stud connectors as shown on the Structural Drawings. Refer to Section 05 30 00 for requirements where studs are installed through metal decking.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 SUPPORT OF OTHER WORK

- A. No permanent loading other than the weight of supported metal deck and concrete slabs shall be imposed on composite beams and girders without prior approval by the Contracting Officer until the concrete in such slabs has achieved 75 percent of its design strength. Contractor shall submit calculations prepared by a Structural Engineer registered in the state of the project verifying the adequacy of the non-composite members to support the anticipated loading prior to developing composite strength. All costs associated with the accommodation of such loading, including review of submittals and modification of structural members and/or details shall be borne by the Contractor.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
 3. Test components of those embedded plates and assemblies to be tested as follows:
 - a. Stud connectors shall have all studs visually and acoustically tested. Studs which have visual defects and/or do not ring when struck with a hammer shall be tested by magnetic particle.
 4. Stud Connectors on composite beams shall be tested as follows:
 - a. All studs shall be acoustically inspected. Studs which do not ring when struck with a hammer shall be bent 15 degrees. If the bent stud does not fracture, stud is acceptable and may be left bent.
 - b. In addition to the above, not less than one of each 100 studs shall be tested by bending 15 degrees. If no fracture occurs, stud is considered acceptable and left bent.
- E. If defective welds are discovered, the remaining uninspected welds shall receive such ultrasonic or magnetic particle inspection as may be required by the Contracting Officer. All cost of additional inspection required by this paragraph shall be borne by the Contractor.
- F. The welding inspector will have the authority to reject weldments. Such rejection may be based on visual inspection where in his opinion the weldment would not pass a more detailed investigation.
- G. Reports by the Testing Agency's Inspector will contain, as a minimum, an adequate description of each weld tested, the identifying mark of the welder responsible for the weld, critique of any defects noted by visual inspection or testing, and a statement regarding the acceptability of the weld tested, as judged by current A.W.S. standards. Reports shall be distributed as early as possible but not later than one workweek after the tests have been performed.
- H. Radiographic testing may be substituted for ultrasonic.

- I. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- J. Drilled-In Inserts:
 - 1. Self-Expanding Inserts: The Testing Agency shall inspect self-expanding, drilled-in inserts shown on the structural drawings as follows:
 - 2. Prior to installation, the Testing Agency shall determine that the installing contractor has the proper materials and equipment for drilling holes in the receiving surface of required diameter and length.
 - 3. All inserts shall be visually inspected after installation to ensure that they have been installed perpendicular to the receiving surface and to proper depth.
 - 4. Inspect the first 10 and 10% of all remains inserts for a tension load of 150% of the Manufacturer's recommended allowable working loads in tension.
- K. Adhesive-Bonded Inserts and Rebar Anchored into Hardened Concrete: The Testing Agency shall inspect adhesive-bonded, drilled-in inserts and anchored rebar as follows:
 - 1. The Testing Agency shall be present at the site to observe the installation of all inserts placed. Such observation shall be to ensure that drilled holes are of required diameter and depth, holes are properly cleaned prior to installation of the insert, and that holes are completely filled with properly mixed adhesive after installation.
 - 2. All inserts shall be visually inspected after installation to ensure that the insert has been installed perpendicular to the receiving surface and to proper depth.
 - 3. Inspect the first 10 and 10% of all remaining inserts for a tension load of 150% of the Manufacturer's recommended allowable working loads in tension.

3.7 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 05 12 00

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Miscellaneous steel framing and supports.
2. Metal roof ladders.
3. Gates at utility enclosure.
4. Steel tube railings and guardrail assemblies.
5. Metal bollards.

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

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete.
2. Steel weld plates and angles for casting into concrete.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufactured metal ladders.
2. Manufactured Metal bollards.
3. Abrasive metal nosings.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

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

1.3 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

B. Joint Finishes

1. National Ornamental & Miscellaneous Metals Association: NOMMA Guideline 1
2. Finish handrail joints in accordance with NOMMA Guideline 1. Joints shall be finished as shown in Finish #1.
3. Workmanship: Quality of workmanship expected for each fabrication shall be Class 1 (architectural metals), NAAMM AMP 555-92, as follows:
 - a. Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects should not show when painted or polished.
 - b. Welds should be concealed where possible. Exposed welds are ground to small radius with uniform sized cover unless otherwise noted.

- c. Distortions should not be visible to the eye.
- d. Exposed joints are fitted to a hairline finish.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

2.2 MATERIALS

- 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. Cane Bolt Assembly: Provide cane bolt ¾ inch diameter solid steel rod with overall height of 24 inches with 4 inch handle bent at 90 degrees to remaining rod. 3/16 inch minimum thick bent plate bottom guide with receiver hole welded to gate frame. Upper guide to be same material with receiver hole and padlock shackle for locking. Provide stop plate with cane rest for cane bolt to be received in at up (open) position. Paint assembly to match gate frame.
- C. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.
- E. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- F. Steel Pipe, including handrails: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm), unless otherwise indicated.
 - 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with **G90 (Z275)** coating; **0.108-inch (2.8-mm)** nominal thickness, or as required to meet indicated design requirements.
- H. Aluminum Extrusions: **ASTM B221 (ASTM B221M)**, Alloy 6063-T6.
- I. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
- J. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum or stainless steel.
- B. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099110 "Painting" and Section 099600 "High-Performance Coatings."
- B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) 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.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Close exposed ends of railing members with prefabricated end fittings.
- J. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns typical.
- K. Fabricate items to be hot-dip galvanized with relief holes as required by the galvanizer. Do not use weld tags for identification of pieces use only a temporary weatherproof tag which is removable after erection.
- L. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- D. METAL LADDERS

E. General:

1. Comply with ANSI A14.3.
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

F. Aluminum Ladders:

1. Space siderails **18 inches (457 mm)** apart unless otherwise indicated.
2. Siderails: Continuous extruded-aluminum channels or tubes, not less than **2-1/2 inches (64 mm)** deep, **3/4 inch (19 mm)** wide, and **1/8 inch (3.2 mm)** thick.
3. Rungs: Extruded-aluminum tubes, not less than **3/4 inch (19 mm)** deep and not less than **1/8 inch (3.2 mm)** thick, with ribbed tread surfaces.

2.7 METAL BOLLARDS

- A. Fabricate exterior metal bollards from Schedule 80 steel pipe and interior bollards from Schedule 40 steel pipe.
 1. Where bollards are not indicated to be filled with concrete, cap bollards with **1/4-inch- (6.4-mm-)** thick steel.
- B. Fabricate interior bollards with **3/8-inch- (9.5-mm-)** thick, steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for **3/4-inch (19-mm)** anchor bolts.
- C. Prime steel bollards to comply with Section 099110 "Painting".

2.8 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.9 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.

2.10 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products. Clean all items to SSPC-3. After galvanizing: dress items to remove all sharp protuberances (edge tears, spikes, sharp icicles, etc.) by power sanding or handfiling. Provide zinc rich galvanizing paint to spot repair scratches and abrasions on the galvanized surfaces.
 1. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
 2. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with primers specified in Section 099100 "Painting" unless primers specified in Section 099600 "High-Performance Coatings" are indicated.
- C. 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. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 - 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- D. 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.

PART 3 - EXECUTION

3.1 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.

- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete where indicated and allow concrete to cure seven days before installing.
- B. Anchor bollards to existing construction with anchor bolts. Provide four **3/4-inch (19-mm)** bolts at each bollard unless otherwise indicated.
 - 1. Embed anchor bolts at least **4 inches (100 mm)** in concrete.
- C. Anchor bollards in concrete in formed or core-drilled holes not less than **42 inches (1050 mm)** deep and **3/4 inch (19 mm)** larger than OD of bollard. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately **1/8 inch (3 mm)** toward bollard.
- D. Anchor bollards in place with concrete footings. Center and align bollards in holes **3 inches (75 mm)** above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- E. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Wood blocking and nailers.
4. Wood furring
5. Plywood backing panels.

1.2 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

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

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Shear panels.
5. Power-driven fasteners.
6. Post-installed anchors.
7. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. 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. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. 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 (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. 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.
 - 2. 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. Use where exterior type is not indicated.

3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat miscellaneous carpentry where indicated, and as follows:
 1. Concealed blocking in type I-A construction as indicated on Sheet A020.
 2. Plywood backing panels for electrical and phone equipment.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade or better.
 1. Application: Interior partitions not indicated as load bearing.
 2. Species: Spruce-Pine Fir or Hem-Fir

2.5 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
 1. Extreme Fiber Stress in Bending, Edgewise: 3100 psi (21.3 MPa)
 2. Modulus of Elasticity, Edgewise: 2,000,000 psi (13 700 MPa)

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.
 3. Cants.
 4. Furring.
 5. Grounds.
 6. Utility shelving.
- B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 15 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 1. Northern species, No. 3 Common grade; NLGA.
 2. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction Utility, Stud, or No. 3 grade lumber

of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

- E. 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.

2.7 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.8 METAL FRAMING ANCHORS

- A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- B. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.

2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install shear wall panels to comply with manufacturer's written instructions.
- E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches(406 mm)** o.c.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than **1-1/2 inches(38 mm)** wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

END OF SECTION 061000

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Parapet sheathing.
 - 4. Subflooring.
 - 5. Sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated plywood.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 WALL SHEATHING

- A. Plywood Sheathing: Exposure 1, Structural I sheathing.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

2.5 ROOF SHEATHING

- A. Plywood Sheathing: Exposure 1, Structural I sheathing.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Structural I sheathing.

2.6 PARAPET SHEATHING

- A. Plywood Sheathing: Exposure 1, Structural I sheathing.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

2.7 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, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

2.8 MISCELLANEOUS MATERIALS

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

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- D. Coordinate parapet and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subfloor-Underlayment:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - 2. Subflooring:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - 3. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.

3.3 CEMENTITIOUS BACKER UNIT INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

END OF SECTION 061600

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood roof trusses.
 - 2. Wood girder trusses.

1.2 ALLOWANCES

- A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

1.3 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience and is certified for chain of custody by an FSC-accredited certification body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
 - 1. Design Top Chord Roof Dead Load: 25 lbs/sq ft.
 - 2. Design Roof Live Load as noted on the Structural drawings.
 - 3. Roof Deflection: 1/240, total load, 1/360 snow load.
 - 4. Provide trusses fabricated with integral parapet members as shown on the Structural drawings.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (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. Provide dry lumber with 15 percent maximum moisture content at time of dressing.

2. Species and Grade: Spruce-Pine-Fir, WWPA Grade Select Structural, or Douglas Fir, WWPA Grade Select Structural.

- B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

- A. Connector Plates:

1. Alpine Engineered Products, Inc; www.alpeng.com.
2. MiTek Industries, Inc; www.mii.com.
3. Truswal Systems; www.truswal.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

- B. General: Fabricate connector plates to comply with TPI 1.

- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

- B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Framing Anchors and Hangers:

1. Simpson Strong-Tie; www.strongtie.com
2. USP Connectors; www.USPconnectors.com
3. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Allowable design loads, as published by manufacturer, shall comply with or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

2.6 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry."
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION 061753

SECTION 06 4116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-faced architectural cabinets.
 - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.
- B. Related Requirements:
 - 1. Section 12 3626 “Simulated Stone Countertops”

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, fire-retardant-treated materials, and, cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
 - 1. Plastic laminates, for each color, pattern, and surface finish.
 - 2. Thermoset decorative panels, for each color, pattern, and surface finish.

1.3 QUALITY ASSURANCE

- A. Fabricator and Installer Qualifications: Certified participant in AWI's Quality Certification Program or meet quality standards of an AWI certified Fabricator and Installer.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets 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.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide certificates from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following as noted on drawings:
 - a. Formica
 - b. Wilsonart International; Div. of Premark International, Inc.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade HGS.
 - 4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
 - 5. Edges: Grade HGS PVC tape, 3mm minimum thickness, color as selected from manufacturer's standard colors.
- G. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - 2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - 3. Drawer Bottoms: Thermoset decorative panels.
- H. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. 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 scheduled on drawings.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
 - 2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
 - 3. Softwood Plywood: DOC PS 1.
 - 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
 - 5. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 7111 "Door Hardware (Descriptive Specification)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
 - 1. Basis-of-Design:
 - a. Blum Clip Top 170 degree hinge with self-close, contractor's option for Screw-on, Press-in or Inserta type.
 - b. Blumotion soft close model # 973A6000.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
 - 1. Basis-of-Design: Epc0 AP192-SS Stainless Arch Pull.
- D. Shelf Rests: BHMA A156.9, B04013; metal.
- E. Drawer Slides: BHMA A156.9.
 - 1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides with self-close and soft-close.
 - a. Basis-of-design, Blum Metabox full extension drawer glides with soft close glides or equivalent.
- F. Door Locks: BHMA A156.11, E07121.
- G. Drawer Locks: BHMA A156.11, E07041.
- H. Door and Drawer Silencers: BHMA A156.16, L03011.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Stainless Steel: BHMA 630.

- J. Pull out trash hardware: Rev-a-shelf RV814 Series Pullout Waste Container or Architect approved equivalent.
 - 1. Select model size based on final cabinet width
 - 2. Polymer Waste Container, to be selected from manufacturer's standard colors.
 - 3. Provide trash grommet above in countertop, re: countertop spec.
- K. Lazy Susan: Rev-a-shelf Polymer Value Line Kidney Shaped Lazy Susan or Architect approved equivalent.
- L. Floating, Hidden Shelf Bracket: Basis-of-Design A&M Hardware Floating Shelf Bracket, 6" deep x 1.75" tall x 1.5" wide x .25" thick. 2,000 lbs per pair.

2.4 Shelving:

- A. Closet and Utility Shelving: Made from the following material, 3/4 inch (19 mm) thick.
 - 1. Plastic laminate-faced particleboard with applied PVC front edge.
- B. Fixed Shelf & Rod Bracket: Basis-of-Design Knape and Vogt Closet Pro, Model # 0045 Fixed Shelf and Rod Bracket with chrome finish or equivalent.
- C. Rod: Basis-of-Design Knape and Vogt Closet Pro, Model # 0018 Cut to length closet rod, 1-1/4" diameter steel tube with chrome finish or equivalent.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain urea formaldehyde.
- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

- A. Complete fabrication, including assembly 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.

- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. 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.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
- E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish as required.

END OF SECTION 06 4116

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SECTION 06 6400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes plastic sheet paneling. FRP

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or Architect approved equivalent:
 - a. Crane Composites, Inc.
 - b. Marlite.
 - c. Nudo Products, Inc.
 - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. Class C Fire Rated
 - 4. Nominal Thickness: Not less than 0.09 inch (2.3 mm).
 - 5. Surface Finish: Pebbled.
 - 6. Color: As scheduled.

2.2 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: As selected from manufacturer's standard colors to match sheets.
- B. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."
 1. Marlite brand Silicone Sealant, clear MS250.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels and so that trimmed panels at corners are not less than 12 inches (300 mm) wide.

3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions for waterproof installation.
- B. Install panels in a full spread of adhesive.
- C. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
 1. At high moisture or wet areas trim molding should surround all panels and be properly sealed with a continuous bead of sealant. Silicone Sealant is best applied to trim molding prior to application to the wall. (see manufacturer's written instructions) It is important that a continuous, non-broken bead of sealant is applied. Excess sealant "squeeze – out" should be promptly cleaned off with mineral spirits. It is suggested that a sealant be applied to all exposed edges of molding, electric plates and other covers after installation.
- D. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- E. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 06 6400

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Molded (expanded) polystyrene foam-plastic board insulation.
3. Glass-fiber blanket insulation.
4. Mineral-wool blanket insulation.
5. Loose-fill insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Molded (expanded) polystyrene foam-plastic board insulation.
3. Glass-fiber blanket insulation.
4. Mineral-wool blanket insulation.
5. Loose-fill insulation.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. CertainTeed Corporation.
 2. Guardian Building Products, Inc.
 3. Johns Manville.
 4. Knauf Insulation.
 5. Owens Corning.
 6. Rockwool

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. Rigid Insulation at Wall: Extruded Polystyrene Board Insulation, Type X: ASTM C578, Type X, 15-psi (104-kPa) minimum compressive strength; unfaced.
1. Basis-of-design product: Owens-Corning Formular CW15 (XPS).
 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.
 6. Sustainability: Hydrochlorofluorocarbon (HCFC) free with zero ozone depletion potential.
 7. Location: Behind metal wall panels or any above ground location where rigid insulation is indicated, unless another type is specifically indicated.
- B. Perimeter Foundation Insulation: Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced.
1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 2. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.
 5. Sustainability: Hydrochlorofluorocarbon (HCFC) free with zero ozone depletion potential.
 6. Location: Vertical foundation wall surfaces as indicated on drawings.
- C. Under-slab insulation for insulated floors: Extruded Polystyrene Board Insulation, Type VII: ASTM C578, Type VII, 60-psi (414-kPa) minimum compressive strength.
1. Basis-of-design product: Owens-Corning Formular 600 (XPS).
 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

5. Location: Below slabs of coolers and freezers as indicated on drawings.
6. Thickness: Total thickness is as indicated on drawings. Provide the minimum number of layers required to achieve the indicated total thickness.
7. Sustainability: Manufactured with zero ozone depletion potential.

2.3 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
 1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 2. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches (305 mm)** and wider in width.

2.4 MINERAL-WOOL BLANKET INSULATION

- A. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.
 1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 2. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches (305 mm)** and wider in width.

2.5 LOOSE-FILL INSULATION

- A. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics.
 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 85 percent.

2.6 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
 2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
- C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

- D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- 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. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately **24 inches (610 mm)** o.c. both ways on inside face and as recommended by manufacturer.
1. Fit courses of insulation between wall furring and other obstructions, with edges butted tightly in both directions, and with faces flush.
 2. Press units firmly against inside substrates.
- B. Mineral-Wool Board Insulation: Install insulation fasteners **4 inches (100 mm)** from each corner of board insulation, at center of board, and as recommended by manufacturer.
1. Fit courses of insulation between obstructions, with edges butted tightly in both directions, and with faces flush.
 2. Press units firmly against inside substrates.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. 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.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain **3-inch (76-mm)** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed **96 inches (2438 mm)**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 6. For wood-framed construction, install blankets according to ASTM C1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- B. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
1. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Building wrap.
 2. Flexible flashing.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.
1. Basis-of-Design Product: Dupont Tyvek Commercialwrap or approved equal.
 2. Water-Vapor Permeance: Not less than 20 perms (1150 ng/Pa x s x sq. m) per ASTM E96/E96M, Desiccant Method (Procedure A).
 3. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 FLEXIBLE FLASHING

- A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. [DuPont Safety and Construction.](#)
 - b. [GCP Applied Technologies Inc.](#)
 - c. [Raven Industries, Inc.](#)
2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover sheathing with water-resistive barrier as follows:
 1. Cut back barrier **1/2 inch (13 mm)** on each side of the break in supporting members at expansion- or control-joint locations.
 2. Apply barrier to cover vertical flashing with a minimum **4-inch (100-mm)** overlap unless otherwise indicated.
- B. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.
 1. Seal seams, edges, fasteners, and penetrations with tape.
 2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 1. Lap seams and junctures with other materials at least **4 inches (100 mm)** except that at flashing flanges of other construction, laps need not exceed flange width.
 2. Lap flashing over water-resistive barrier at bottom and sides of openings.
 3. Lap water-resistive barrier over flashing at heads of openings.

3.3 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

END OF SECTION 072500

SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Below grade vapor retarders.
- B. Related Sections include the following:
 - 1. Section 033000 – Cast-in-Place Concrete, for slabs on grade.
 - 2. Section 133419 – Metal Building Systems, for above ground vapor retarder and accessories installed in pre-engineered metal building systems.

1.2 DEFINITIONS

- A. Vapor Retarder: A material or system designed to impede the transmission of water vapor, with a permeance rating not exceeding 1-perm.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Vapor retarders under slabs-on-grade.
 - 2. Vapor retarders for interior walls.
 - 3. Vapor retarder tapes and accessories for each application.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of vapor retarder through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

PART 2 - PRODUCTS

2.1 BELOW-GRADE VAPOR RETARDERS

- A. VAPOR RETARDER-1: Polyolefin film-type product complying with ASTM E 1745, Class A.
 - 1. Products: One of the following:
 - a. Fortifiber Corporation; Moistop Ultra 15.
 - b. Raven Industries Inc.; Vaporblock 15.
 - c. Reef Industries, Inc.; Griffolyn 15-mil.
 - d. W.R. Meadows, Sealtight Perminator 15-mil.
 - e. Stego Industries, LLC; Stego Wrap 15-mil.
 - 2. Thickness: Minimum 15-mil.
 - 3. Location: Under slabs-on-grade. Refer to drawings for vertical location.
- B. Vapor Retarder Joint Tape: Manufacturer's recommended adhesive or pressure-sensitive joint tape, with a maximum perm rating of 0.3-perms.

PART 3 - EXECUTION

3.1 INSTALLATION, BELOW-GRADE VAPOR RETARDER

- A. Vapor Retarder Under Slabs-on-Grade: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Comply with manufacturer's instructions related to membrane orientation and lapping pattern.
 - 2. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 3. Coordinate installation of vapor retarder with penetrations. Seal around all penetrations through membrane.

3.2 PROTECTION

- A. Protect installed above-grade 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 07 2600

SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standing-seam metal roof panels.
2. Section 133419 – Metal Building Systems, for metal wall panel products that are installed under this section.

B. Related Sections include the following:

1. Section 133419 – Metal Building Systems, for standing-seam metal roof panels at per-engineered metal building.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

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

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

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 35 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** when tested according to ASTM E1680 or ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa)**.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **2.86 lbf/sq. ft. (137 Pa)**.
- D. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E2140.
- E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint

sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 STANDING-SEAM METAL ROOF PANELS

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.

- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.

1. Basis-of-Design Product: Nucor VR16 II-90.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: 0.024 inch (24 gage).
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
3. Clips: One-piece fixed to accommodate thermal movement.
 - a. Material: 0.028-inch- (0.71-mm-) nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
4. Joint Type: Single folded.
5. Panel Coverage: 16 inches (406 mm).
6. Panel Height: 2.0 inches (51 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D1970.
 3. Basis-of-Design Product: Grace Ice & Water Shield HT.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters and Downspouts: Formed from same material as roof panels according to SMACNA's "Architectural Sheet Metal Manual." Finish to match roof fascia trim.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.6 FINISHES

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the entire roof surface.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels as required to comply with manufacturer's written instructions.
- C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.3 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to supports with self-tapping fasteners.
 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum **6-inch (152-mm)** end lap, sealed with sealant and fastened together by interlocking clamping plates.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.4 CLEANING AND PROTECTION

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

END OF SECTION 074113.16

SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exposed-fastener, lap-seam metal wall panels.

B. Related Sections include the following:

1. Section 133419 – Metal Building Systems, for metal wall panel products that are installed under this section.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

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

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

- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

- B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

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

1.7 WARRANTY

- A. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 35 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
- B. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: as specified in section 133419 Metal Building Systems. Panels shall match those provided for the pre-engineered metal building.

2.2 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, **G90 (Z275 hot-dip galvanized)** coating designation or ASTM A792/A792M, **Class AZ50 (Class AZM150)** aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.3 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.4 FINISHES

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION

- A. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 5. Flash and seal panels with weather closures at perimeter of all openings.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

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

END OF SECTION 074213.13

SECTION 074293 - SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal soffit panels.

B. Related Sections include the following:

1. Section 133419 – Metal Building Systems, for soffit panels at pre-engineered metal building canopies.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 WARRANTY

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

1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 1. Wind Loads: As indicated on Drawings.
 2. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** when tested according to ASTM E283 at the following test-pressure difference:
 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa)**.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 1. Test-Pressure Difference: **6.24 lbf/sq. ft. (300 Pa)**.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.

2.2 METAL SOFFIT PANELS

- A. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile Metal Soffit Panels: Solid and Perforated panels as indicated on drawings, formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels. Panel ribs designed to appear similar to joints to create the impression of a 3" to 4" wide panel on a 10" to 12" panel coverage.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; L-Panel, or approved equal product.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, **G90 (Z275)** coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, **Class AZ50 (Class AZM150)** coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: **0.024 inch (24 gage)**.
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
3. Panel Coverage: **12 inches (305 mm)**.
4. Panel Height: **1.0 inch (25 mm)**.
5. Venting Area: Where perforated panels are indicated on drawings, provide panels with a minimum of 5% net free venting area.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, **G90 (Z275 hot-dip galvanized)** coating designation or ASTM A792/A792M, **Class AZ50 (Class AZM150)** aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; **1/8 inch (3 mm)** thick.
 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

- A. Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION

- A. Metal Soffit Panels, General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

- 1.

3.3 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074293

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SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Roof insulation.
4. Cover board.
5. Walkways

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Sustainable Design Submittals:

C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples: For the following products:

1. Roof membrane and flashings, of color required.

E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

- B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
 - 1. Fire/Windstorm Classification: Class 1A-90.
 - 2. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 MH.
- E. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
 - 1. Wind Uplift Load Capacity: 90 psf.
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, TPO sheet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products.
 - c. GAF Materials Corporation.
 - d. GenFlex Roofing Systems.
 - e. Johns Manville.
 - f. Mule-Hide Products Co., Inc.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.
- B. Source Limitations: Obtain components including roof insulation and fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Bonding Adhesive: Manufacturer's standard.
- E. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- G. 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.

2.4 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 1. Size: 48 by 48 inches (1219 by 1219 mm).
 2. Thickness: As indicated on drawings and to achieve R-values indicated on drawings.
- B. Tapered Insulation: Provide factory-tapered insulation boards.
 1. Material: Match roof insulation.
 2. Minimum Thickness: 1/4 inch (6.35 mm).
 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.5 INSULATION ACCESSORIES

Retain "Fasteners" Paragraph below if insulation requires mechanical fastening. Retain option if separate cover boards require fastening.

- A. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

Retain one of first three subparagraphs below.

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
- C. Cover Board: High Density Polyisocyanurate Board Insulation :ASTM C1289 Type II, Class 4, Grade 1, **1/2-inch- (13-mm-)** thick polyisocyanurate, with a minimum compressive strength of **80 psi (551 kPa)**.

2.6 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately **3/16 inch (5 mm)** thick and acceptable to roofing system manufacturer.
1. Size: Approximately **36 by 60 inches (914 by 1524 mm)**.

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 minimum concrete drying period recommended by roofing system manufacturer has passed.
 2. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.
 - a. Test Frequency: One test probe per each **1000 sq. ft. (93 sq. m)**, or portion thereof, of roof deck, with not less than three tests probes.
 - b. Submit test reports within 24 hours after performing tests.
 3. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

3.2 PREPARATION

- A. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
1. Submit test result within 24 hours after performing tests.
 - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

3.4 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Concrete Decks:
 - 1. Install base layer of insulation with joints staggered not less than 24 inches (610 mm) in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - f. Adhere base layer of insulation to concrete roof deck according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Prime surface of concrete deck per manufacturer's written instructions, and allow primer to dry.
 - 2) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches (305 mm) in adjacent rows.

- b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- c. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
- d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water flow is unrestricted.
- e. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
- f. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
- g. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of **6 inches (150 mm)** in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 - 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 4. Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF ADHERED ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- A. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

- B. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- D. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- F. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- G. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.7 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. 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.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. 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.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 INSTALLATION OF WALKWAYS

- A. Flexible Walkways:
 - 1. Install flexible walkways at the following locations:
 - a. Retain one or more subparagraphs below. Revise to suit Project.
 - b. Perimeter of each rooftop unit.

- c. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - d. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - e. Top and bottom of each roof access ladder.
 - f. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - g. Locations indicated on Drawings.
 - h. As required by roof membrane manufacturer's warranty requirements.
2. Provide **6-inch (76-mm)** clearance between adjoining pads.
 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system 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 roofing system that does not comply with requirements, repair substrates, and repair or reinstall 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 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall sheet metal fabrications.

- B. Generally, flashings are part of the pre-engineered metal building package under Section 133419 Metal Building Systems, or are purchased from the metal building manufacturer so all metal panels and associated flashings will match. This section covers miscellaneous flashings and sheet metal fabrications that are not included in the metal building packages or not described in Section 133419 Metal Building Systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.
2. Elastomeric sealant.
3. Butyl sealant.
4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.

9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.

- C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long by actual width.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested.
- B. Evaluation Reports: For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.
- C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Special warranty.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A755/A755M.
 - 1. Surface: Smooth, flat.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3. Color: To match adjacent material or as indicated on drawings. Where no color is indicated on drawings and there are multiple adjacent material, architect shall select from manufacturer's range.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
 1. Basis of design: Grace Ultra by W.R. Grace or approved equal.
 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
 3. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F (29 deg C) or lower.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Solder:
 1. For Zinc-Coated (Galvanized) Steel: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

- E. Elastomeric Sealant: ASTM C920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
- J. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
 - 1. Material: Galvanized steel, 0.022 inch (0.56 mm) thick.
 - 2. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 3. Accessories:
 - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
 - 4. Finish: With manufacturer's standard color coating to match adjacent roof specialties.

2.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 3. 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.
 - 4. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 5. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 6. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams:
 - 1. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters:
 - 1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
 - 2. Fabricate in minimum 96-inch- (2400-mm-) long sections.
 - 3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
 - 4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
 - 5. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following materials:
 - a. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) <Insert dimension> thick.
- B. Downspouts: Fabricate rectangular downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
 - 1. Hanger Style: Two-piece hanger with mounting flange behind gutter, similar to SMACNA Figure 1-35B
 - 2. Fabricate from the following materials:
 - a. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Fasteners may be used on exterior faces at copings over metal wall panels where indicated on drawings and allowed by metal panel manufacturer. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Fabricate from the following materials:
 - a. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch (1.02 mm) thick.
- B. Base Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.
- C. Counterflashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.
- D. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

2.8 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.
- B. Valley Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.
- C. Drip Edges: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.
- D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

2.9 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.
- B. Wall Expansion-Joint Cover: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering, High-Temperature Sheet Underlayment:
1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
 2. Prime substrate if recommended by underlayment manufacturer.
 3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
 4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses.
 5. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller.
 6. Roll laps and edges with roller.
 7. Cover underlayment within 14 days.
- B. Install slip sheet, wrinkle free, over underlayment, or directly on substrate as indicated on drawings, before installing sheet metal flashing and trim.
1. Install in shingle fashion to shed water.
 2. Lapp joints not less than 4 inches (100 mm).

3.2 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder welds sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Space individual cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 6. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 7. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.
1. Pretin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pretinning where pretinned surface would show in completed Work.
 2. Do not solder metallic-coated steel and aluminum sheet.
 3. Do not pretin zinc-tin alloy-coated copper.
 4. Do not use torches for soldering.
 5. Heat surfaces to receive solder, and flow solder into joint.
 - a. Fill joint completely.
 - b. Completely remove flux and spatter from exposed surfaces.

3.3 INSTALLATION OF ROOF-DRAINAGE SYSTEM

- A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters:
1. Join sections with joints sealed with sealant.
 2. Provide for thermal expansion.
 3. Attach gutters at eave or fascia to firmly anchor them in position.
 4. Provide end closures and seal watertight with sealant.
 5. Slope to downspouts.
 6. Install gutter with expansion joints at locations indicated on Drawings, but not exceeding, 50 feet (15.2 m) apart. Install expansion-joint caps.
- C. Downspouts:
1. Join sections with 1-1/2-inch (38-mm) telescoping joints.
 2. Provide hangers with fasteners designed to hold downspouts securely to walls.
 3. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
 4. Provide elbows at base of downspout to direct water away from building where downspouts are not connected to underground drainage.
 5. Connect downspouts to underground drainage system as indicated on Civil drawings.
- D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated on Drawings. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

3.4 INSTALLATION OF ROOF FLASHINGS

- A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing:
1. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- C. Copings:
1. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
 - a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch (600-mm) centers.
 - b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch (600-mm) centers.

- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
 - 1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
 - 2. Extend counterflashing 4 inches (100 mm) over base flashing.
 - 3. Lap counterflashing joints minimum of 4 inches (100 mm).
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.8 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. 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, as determined by Architect.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof hatches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
- B. Shop Drawings: For roof accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF HATCHES

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, and integrally formed deck-mounting flange at perimeter bottom.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AES Industries, Inc.
 - b. Babcock-Davis.

- c. Bilco Company (The).
 - d. Dur-Red Products.
 - e. J. L. Industries, Inc.
 - f. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
2. Type and Size: Single-leaf lid, 36 by 36 inches.
 3. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 30-lbf/sq. ft. (1.4-kPa) internal uplift load.
 4. Curb, Framing, and Lid Material: Zinc-coated (galvanized) steel sheet.
 - a. Thickness: 0.079 inch (2.01 mm).
 - b. Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's standard range.
 5. Construction:
 - a. Insulation: 1-inch- (50-mm-) thick minimum, polyisocyanurate board.
 - 1) R-Value: 6.0 minimum according to ASTM C1363.
 - b. Nailer: Factory-installed wood nailer continuous around hatch perimeter.
 - c. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
 - d. Exterior Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
 - e. Fabricate curbs to minimum height of 12 inches (305 mm) above roof membrane surface.
 6. Hardware: Manufacturer's standard corrosion resistant; with hinges, hold-open devices, and independent manual-release devices for inside operation of lids.
 7. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. Post locks in place on full extension; release mechanism returns post to closed position.

2.2 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.
 1. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A755/A755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight.
 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- B. Stainless Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.
- C. Steel Shapes: ASTM A36/A36M, hot-dip galvanized according to ASTM A123/A123M unless otherwise indicated.

- D. Steel Tube: ASTM A500/A500M, round tube.
- E. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized according to ASTM A123/A123M.
- F. Steel Pipe: ASTM A53/A53M, galvanized.

2.3 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWWA C2; not less than 1-1/2 inches (38 mm) thick.
- D. Underlayment:
 - 1. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D4397.
 - 2. Slip Sheet: Building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum, rosin sized.
 - 3. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
- E. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
- F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- G. Elastomeric Sealant: ASTM C920, elastomeric polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- H. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of uncoated aluminum stainless steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
- C. Roof-Hatch Installation:
1. Install roof hatch so top surface of hatch curb is level.
 2. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
 3. Attach ladder-assist post according to manufacturer's written instructions.
- D. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A780/A780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 077253 - SNOW GUARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rail-type, seam-mounted snow guards.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
 - 1. Include details of rail-type snow guards.
- C. Samples:
 - 1. Rail-Type Snow Guards: Bracket, 12-inch- (300-mm-) long rail, and installation hardware.
 - a. For units with factory-applied finishes, submit specified color.
- D. Delegated-Design Submittal: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include calculation of number and location of snow guards.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating load at failure of attachment to roof system identical to roof system used on this Project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design snow guards, including attachment to roofing material and roof deck, applicable for attachment method, based on the following:
 - 1. Roof snow load.
 - 2. Snow drifting

3. Roof slope.
 4. Roof type.
 5. Roof dimensions.
 6. Roofing substrate type and thickness.
 7. Snow guard type.
 8. Snow guard fastening method and strength.
 9. Snow guard spacing.
 10. Coefficient of Friction Between Snow and Roof Surface: 0.
 11. Factor of Safety: 2.
- B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

- A. Rail-Type, Seam-Mounted Snow Guards:
1. Basis-of-Design Product: ColorGard by S-5! with Unpunched crossmembers and VersaClip; S-5! Clamps, shape as required for roof panel profile; SnoClip III, two per 16" wide roof panel and three per 24" wide roof panel. Provide specified system or obtain approval for substitutions per 016000 Product Requirements. Products must be equal in quality and appearance and retain an equivalent amount of snow.
 2. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with one rail with integral track to accept color-matching inserts of material and finish used for metal roof. Include manufacturer's clips or equivalent system for preventing snow and ice migration below the rails.
 3. Brackets and Baseplates: ASTM B209 (ASTM B209M) aluminum, mill finish; or ASTM A240/A240M, Type 304 stainless steel, mill finish.
 4. Bars: ASTM B221 (ASTM B221M) aluminum, mill finish; or ASTM A240/A240M, Type 304 stainless steel, mill finish.
 - a. Profile: Square with integral track to accept color-matching inserts of material and finish used for metal roof.
 5. Seam clamps: ASTM B221 (ASTM B221M) aluminum extrusion or ASTM B85/B85M aluminum casting with stainless steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached. All materials in contact with metal panels shall be metallurgically compatible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
 - 1. Space rows as indicated on Drawings.
- B. Attachment for Standing-Seam Metal Roofing:
 - 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
 - 2. Rail-Type, Seam-Mounted Snow Guards:
 - a. Install brackets to vertical ribs in straight rows.
 - b. Secure with stainless steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
 - c. Torque set screw according to manufacturer's instructions.
 - d. Install cross members to brackets.

END OF SECTION 077253

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SECTION 079100 - PREFORMED JOINT SEALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes preformed, foam joint seals.

1.2 ACTION SUBMITTALS

- A. Product Data: For each preformed joint seal product.
- B. Samples for Verification: For each type and color of preformed joint seal required.
- C. Preformed joint seal schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace preformed joint seals that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish preformed joint seals to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PREFORMED, FOAM JOINT SEALS

- A. Preformed, Foam Joint Seals: Manufacturer's standard joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. (160 kg/cu. m) , impregnated with a nondrying, water-repellent agent, and coated with silicone for a weather

tight seal. Factory produce in precompressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.

1. Basis-of-Design Product: Seismic Colorseal by Emseal.
2. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Movement Capability: -50 percent/+50 percent.
3. Joint Seal Color: As selected by Architect from full range of industry colors.

2.2 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by preformed-joint-seal manufacturer for joint substrates indicated.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to preformed joint seal manufacturer, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces, and formulated to promote best adhesion to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with preformed joint seals and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing preformed joint seals to comply with preformed joint seal manufacturer's written instructions and the following requirements:
 1. Remove laitance and form-release agents from concrete.
 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by preformed joint seal manufacturer or as indicated by tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of adhesive or primer with adjoining surfaces.

3.2 INSTALLATION

- A. General: Comply with preformed joint seal manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Installation of Preformed, Foam Joint Seals:

1. Install each length of seal immediately after removing protective wrapping.
2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.
3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.
4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

END OF SECTION 079100

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- ##### A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- ##### A. Product Data: For each joint-sealant product.
- ##### B. Samples: For each kind and color of joint sealant required.
- ##### C. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- ##### A. Sample warranties.
- ##### B. Product Certificates: For each type of joint sealant and accessory, by product manufacturer.
- ##### C. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

- ##### A. Installer Qualifications: Experienced Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- ##### B. Source Limitations: Obtain each type of joint sealant through one source from a single

manufacturer.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; Dow Corning® 795 Silicone Building Sealant.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295 FPS NB.
 - d. Pecora Corporation; 864NST.
 - e. Sika Corporation; Joint Sealants; Sikasil WS-295.
 - f. Tremco Incorporated; Spectrem 2.

2.2 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation-Construction Systems; MasterSeal CR 195 (Pre-2014: Sonolastic Ultra).
 - b. Pecora Corporation; Dynatrol I-XL.
 - c. Sherwin-Williams Company (The); Stampede-1.

- d. Sika Corporation; Sikaflex Textured Sealant.
- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation-Construction Systems; MasterSeal SL 1 (Pre-2014: Sonolastic SL1).
 - b. Pecora Corporation; NR-201.
 - c. Polymeric Systems, Inc; Flexiprene 952.
 - d. Schnee-Morehead, Inc., an ITW company; Permathane SM7101.
 - e. Sherwin-Williams Company (The); Stampede 1SL.
- C. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. LymTal International Inc.

2.3 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; DOW CORNING® 786 SILICONE SEALANT.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 100 WF.
 - d. Tremco Incorporated; Tremsil 200.
- C. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; AC-20.
 - b. Sherwin-Williams Company (The);950A Siliconized Acrylic Latex Caulk, White.
 - c. Tremco Incorporated; Tremflex 834.

2.4 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation-Construction Systems; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
 - b. Construction Foam Products; a division of Nomaco, Inc.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 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 laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

- B. Install sealant backings of kind indicated to support 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.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings 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 to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 1. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.3 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - 2. Joint Sealant: Urethane, M, P, 50, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P, 25, T, NT.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples: For each kind and color of acoustical joint sealant required.
- C. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation
 - b. GE Construction Sealants
 - c. Pecora Corporation
 - d. Tremco Incorporated
 - e. USG Corporation
 - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.
- B. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

END OF SECTION 079219

SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior expansion joint covers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each expansion joint cover assembly.
 - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 EXTERIOR EXPANSION JOINT COVERS (BELLOWS EXPANSION JOINT)

- A. Exterior Flexible expanded rubber membrane and closed cell foam bellow with two 4 inch (102 mm) metal flanges, surface mount, waterproof; accommodating seismic movement with lateral shear.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
 - a. Balco, a CSW Industrials Company
 - b. BASF Corp
 - c. Construction Specialties, Inc.
 - d. Inpro Corporation
 - e. Johns Manville
 - f. Nystrom
 - 2. Application and configuration: as indicated on drawings.
 - 3. Design Criteria:

- a. Bellow Size: As indicated on Drawings.
- b. Nominal Joint Width: As indicated on Drawings.
- c. Movement Capability: 2” in either direction, horizontally and laterally.
- d. Material:
 - 1) Flange: Galvanized steel - 26 gauge (0.56 mm) or Stainless steel - 0.018 inch (0.46 mm).
 - 2) Bellow:
 - a) Flexible Membrane Cover: 60 mil (1.5 mm) EPDM sheet.
 - b) Color: Black.
- e. Attachment Method: Mechanical fasteners.

2.3 MATERIALS

- A. Aluminum: ASTM B221 (ASTM B221M), Alloy 6063-T5 for extrusions; ASTM B209 (ASTM B209M), Alloy 6061-T6 for sheet and plate.
- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Fire Barriers: Any material or material combination, to comply with performance criteria for required fire-resistance rating.
- D. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.4 ACCESSORIES

- A. Moisture Barriers: Manufacturer's standard moisture barrier consisting of a continuous, waterproof membrane within joint and attached to substrate on sides of joint.
 1. Provide where indicated on Drawings.
- B. Manufacturer's standard attachment devices, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.
- C. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

- D. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 4. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 5. Locate anchors at interval recommended by manufacturer, but not less than **3 inches (75 mm)** from each end and not more than **24 inches (600 mm)** o.c.
- E. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
1. Provide in continuous lengths for straight sections.
 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- F. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- G. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
- H. Moisture Barrier Drainage: If indicated, provide drainage fitting and connect to drains.
- I. Transition from Roof to Wall Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof expansion joint covers. Install factory-fabricated units at transition between exterior walls and soffits and roof expansion joint cover assemblies.

3.2 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections.

END OF SECTION 079513.16

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SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames. Standard hollow metal may be used at all locations where the requirements of the drawings and specifications permit.
2. Custom hollow metal doors and frames.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
- C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.3 SUBMITTALS

- A. Bundled Submittal: Make submittal related to Sections listed below in a single package. Include product data, shop drawings, and schedule data.
 1. Section 08 1113 – Hollow Metal Doors and Frames
 2. Section 08 4113 – Aluminum Framed Entrances and Storefronts
 3. Section 08 1416 – Flush Wood Doors
 4. Section 08 7100 – Door Hardware
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and temperature-rise ratings where required by governing authorities, 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. Locations of reinforcement and preparations for hardware.
 5. Details of each different wall opening condition.
 6. Details of anchorages, joints, field splices, and connections.
 7. Details of accessories.
 8. Details of moldings, removable stops, and glazing.
 9. Details of conduit and preparations for power, signal, and control systems.

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

1.4 QUALITY ASSURANCE

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

1.5 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.
 - 1. Provide additional protection to prevent damage to finish of factory-finished units.
 - 2. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided the finished items are equal in all respects to new work and acceptable to the Architect. Otherwise, remove and replace damaged items as directed.
 - 3. If cardboard wrappers on doors become wet, remove immediately.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.6 PROJECT CONDITIONS

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

1.7 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amweld Building Products, LLC.
 2. Ceco Door Products; an Assa Abloy Group company.
 3. Curries Company; an Assa Abloy Group company.
 4. Firedoor Corporation.
 5. Republic Doors and Frames
 6. Steelcraft; an Allegion brand.
 7. Southwestern Hollow Metal, Rifle, CO 81650.
 8. Windsor Republic Doors, Inc.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) 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.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. 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. Powder-Actuated Fasteners are only permitted at existing, in-place concrete.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. 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.
- H. Glazing: Comply with requirements in Division 08 Section "Glazing."

- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD 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.
 1. Design: Flush panel
 2. Core Construction: Manufacturer's standard vertical steel-stiffener core.
 - a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363. Door and frame assemblies shall have a U-factor of not more than 0.38 deg Btu/F x h x sq. ft. (2.16 W/K x sq. m) when tested according to ASTM C 518
 - 1) Locations: Exterior doors.
 3. Vertical Edges for Single-Acting Doors: Beveled edge.
 - a. Beveled Edge: 1/8 inch in 2 inches.
 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
 5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick, end closures or channels of same material as face sheets.
 6. 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), Model 1 (Full Flush) Model 2 (Seamless) or Model 3 (Stile and Rail) if Stile and Rail doors are indicated on drawings.
- 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), Model 2 (Seamless).
 2. Where Stile and Rail doors are indicated on drawings, provide Level 3 and Physical Performance Level A (Extra Heavy Duty), Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Provide Standard Hollow Metal Frames for Standard Hollow Metal Doors. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as full profile welded unless otherwise indicated.
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as full profile welded unless otherwise indicated.
 - 3. Frames for Level 2 Steel Doors: 0.053-inch-thick steel sheet.
 - 4. Frames for Wood Doors: 0.053-inch-thick steel sheet.
 - 5. Frames for Borrowed Lights: 0.053-inch-thick steel sheet
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 CUSTOM HOLLOW METAL DOORS

- A. General: Provide doors not less than 1-3/4 inches thick, of seamless hollow construction unless otherwise indicated. Construct doors with smooth surfaces without visible joints or seams on exposed faces. Comply with ANSI/NAAMM-HMMA 861.
- B. Exterior Door Face Sheets: Fabricated from metallic-coated steel sheet, minimum 0.053 inch thick.
- C. Interior Door Face Sheets: Fabricated from cold-rolled steel sheet, minimum 0.042 inch thick.
- D. Core Construction: Provide thermal-resistance-rated cores for exterior doors.
 - 1. Steel-Stiffened Core: 0.026-inch-thick, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart, spot welded to face sheets a maximum of 5 inches o.c. Spaces filled between stiffeners with glass- or mineral-fiber insulation.
 - a. Fire Door Core: As required to provide fire-protection ratings indicated and required temperature-rise rating.
 - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
- E. Vertical Edges for Single-Acting Doors: Beveled 1/8 inch in 2 inches.
- F. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.

- G. Top and Bottom Channels: Closed with continuous channels, minimum 0.053 inch thick, of same material as face sheets and spot welded to both face sheets.
- H. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 with reinforcing plates from same material as door face sheets.

2.6 CUSTOM HOLLOW METAL FRAMES

- A. General: Provide Custom Hollow Metal Frames for Custom Hollow Metal Doors. Fabricate frames of construction indicated. Close contact edges of corner joints tight with faces mitered and stops butted or mitered. Continuously weld faces and soffits and finish faces smooth. Comply with ANSI/NAAMM-HMMA 861.
 - 1. Door Frames for Openings 48 Inches Wide or Less: Fabricated from 0.053-inch-thick steel sheet.
 - 2. Door Frames for Openings More Than 48 Inches Wide: Fabricated from 0.067-inch-thick steel sheet.
 - 3. Sidelight and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - 4. Borrowed-Light Frames: Fabricated from 0.053-inch-thick steel sheet.
- B. Exterior Frames: Formed from metallic-coated steel sheet.
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
- D. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 with reinforcing plates from same material as frame.
- E. Head Reinforcement: Provide minimum 0.093-inch-thick, steel channel or angle stiffener for opening widths more than 48 inches.

2.7 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.8 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.9 LOUVERS

- A. Provide louvers for doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.
 2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other, any angle.

2.10 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch-wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.11 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 for Standard Hollow Metal or ANSI/NAAMM-HMMA 861 Custom Hollow Metal.
- C. Hollow Metal Doors:
 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 2. Glazed Lites: Factory cut openings in doors.

3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
 - c. Compression Type: Not less than two anchors in each jamb.
 - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8 for Standard Hollow Metal or ANSI/NAAMM-HMMA 861 for Custom Hollow Metal.
 - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 - 4. Provide loose stops and moldings on inside of hollow metal work.
 - 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.12 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

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. Verify with framing Contractor that 18 gauge minimum metal thickness studs were installed in wall framing adjacent to hollow metal frames per Cold-Formed Metal Framing and Non-Structural Metal Framing specifications.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 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 of size and profile indicated. Comply with ANSI/SDI A250.11 for Standard Hollow Metal or HMMA 840 Custom Hollow Metal.
 - 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. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - b. Install frames with removable glazing stops located on secure side of opening.
 - c. Install door silencers in frames before grouting.
 - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - 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 containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Wood and Metal-Stud Partitions: Solidly fill pack frames with mineral wool insulation.
 4. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 5. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
 6. 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.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

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

- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 1113

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 08 8000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

- A. Bundled Submittal: Make submittal related to Sections listed below in a single package. Include product data, shop drawings, and schedule data.
 - 1. Section 08 1113 – Hollow Metal Doors and Frames
 - 2. Section 08 4113 – Aluminum Framed Entrances and Storefronts
 - 3. Section 08 1416 – Flush Wood Doors
 - 4. Section 08 7100 – Door Hardware
- B. Product Data: For each type of door. Include factory-finishing specifications.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; 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.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- D. Samples: For factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program or is a licensee of WI's Certified Compliance Program.

- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eggers Industries.
 2. Graham Wood Doors; an Assa Abloy Group company.
 3. VT Industries, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
 1. Provide AWI Quality Certification or WI Certified Compliance Labels indicating that doors comply with requirements of grades specified.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. WDMA I.S.1-A Performance Grade:
 1. Heavy Duty.
- D. 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.
 1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. 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.
- E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- F. Particleboard-Core Doors:
 1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2, made with binder containing no urea-formaldehyde.
 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
 - 1. Grade: Premium, with Grade A faces.
 - 2. Species: Select White Maple.
 - 3. Cut: Plain Sliced.
 - 4. Match between Veneer Leaves: Book match.
 - 5. Assembly of Veneer Leaves on Door Faces: Running match.
 - 6. Pair and Set Match: Provide for doors hung in same opening.
 - 7. Core: Particleboard.
 - 8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 LIGHT FRAMES

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

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.
- B. Factory machine doors for hardware that is not surface applied.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of same wood species as door, and profile as selected from manufacturer's sticking options.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 8000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: WDMA TR-6 catalyzed polyurethane.

3. Staining: Match Architect's sample.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 08 7100 "Door Hardware."
- 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- and draft-control doors according to NFPA 105.
 - a. Comply with NFPA 80 for fire-rated doors.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 08 1416

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sectional-door assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
- B. Shop Drawings: For each installation and for components not dimensioned or detailed in manufacturer's product data.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements: Comply with provisions in the U.S. Department of Justice's "2010 ADA Standards for Accessible Design" and ANSI ICC A117.1 applicable to sectional doors.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 - 1. Steel Sectional Doors: Manufacturer's limited door and operators System warranty for 10 year from date of Substantial Completion against delamination of polyurethane foam

from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.

2. Impactable Sectional Doors: Manufacturer's limited on track system for 5 years from date of Substantial Completion.
3. Operators: 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Provide sectional doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 1. Design Wind Load: As indicated on Drawings.
 2. Testing: In accordance with ASTM E330/E330M.

2.2 MOTORIZED SECTIONAL-DOOR ASSEMBLY, TYPE J

- A. Steel Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist, and deformation; and complies with requirements in DASMA 102.
 1. Basis-of-Design Product: 591 Series Thermacore Insulated Steel Doors by Overhead Door Company or approved equal.
- B. Operation Cycles: Door components and operators capable of operating for not less than 25,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.
- C. Air Infiltration: Maximum rate of **0.8 cfm/sq. ft.** when tested in accordance with ASTM E283 or DASMA 105.
- D. U-Value: **0.07 Btu/sq. ft. x h x deg F.**
- E. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with hot-dipped galvanized zinc coating.
 1. Door-Section Thickness: **1-5/8 inches.**
 2. Section Faces:
 - a. Thermal-Break Construction: Provide sections with continuous thermal-break construction separating the exterior and interior faces of door.
 - b. Exterior Face: Fabricated from single sheets, not more than **24 inches (610 mm)** high; with horizontal meeting edges rolled to continuous, interlocking, keyed,

rabbeted, shiplap, or tongue-in-groove, weather- and pinch-resistant seals and reinforcing flange return.

- 1) Steel Sheet Thickness: **0.015-inch** nominal thickness.
 - 2) Surface: Manufacturer's standard, ribbed.
- c. Interior Face: Enclose insulation completely within steel exterior facing and interior facing material, with no exposed insulation. Provide the following interior-facing material:
- 1) Zinc-Coated (Galvanized) Steel Sheet: **0.015-inch** nominal thickness.
3. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than **0.040-inch (1.02-mm)** nominal coated thickness and welded to door section.
4. Section Reinforcing: Horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
- a. Bottom Section: Reinforce section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal (weatherseal).
 - b. Hardware Locations: Provide reinforcement for hardware attachment.
5. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation of type indicated below:
- a. Board Insulation: Polystyrene or polyurethane, secured to exterior face sheet.
 - b. Foamed-in-Place Insulation: Polyurethane, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load.
 - c. Fire-Resistance Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84.
- F. Aluminum Sections: **ASTM B221 (ASTM B221M)** extruded-aluminum stile and rail members of alloy and temper standard with manufacturer for type of use and finish indicated; in minimum thickness required to comply with requirements; with rail and stile dimensions and profiles indicated on Drawings; and with overlapped or interlocked weather- and pinch-resistant seal at meeting rails.
1. Door-Section Thickness: **1-5/8 inches**.
 2. Section Reinforcing: Continuous horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Ensure that reinforcement does not obstruct vision lites.
 - a. Hardware Locations: Provide reinforcement for hardware attachment.
 3. Insulated Stiles and Rails: Fill stiles and rails with manufacturer's standard polyurethane expanding foam.

4. Glazed Panels: Manufacturer's standard, aluminum-framed section with glazing sealed with glazing tape and aluminum glazing bead. Glazing as follows:
 - a. Insulating Glass Units: Manufacturers' standard unit with tempered glass lites complying with ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (clear), Quality-Q3.
- G. Track: Manufacturer's standard, galvanized-steel, vertical-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.
 1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 (Z180) zinc coating.
 2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings.
 3. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches (51 mm) apart for door-drop safety device.
 - a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide intermittent jamb brackets attached to track and wall.
- H. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom top jambs of door. Provide combination bottom weatherseal and sensor edge for bottom seal.
- I. Windows: Manufacturer's standard window units of shape and size and in locations indicated on Drawings. Set glazing in vinyl, rubber, or neoprene glazing channel. Provide removable stops of same material as door-section frames. Provide the following glazing:
 1. Insulating Glass Units: Manufacturer's standard.
- J. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
 1. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch (2.01-mm) nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.
 - a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.
 2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.
 - a. Roller-Tire Material: Manufacturer's standard.
- K. Locking Device:
 1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks, operable from inside only.

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

L. Counterbalance Mechanism:

1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
 - a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
3. Cables: Galvanized-steel, multistrand, lifting cables.
4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.
5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

M. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at **8 ft. (2.4 m)** or lower.
4. Usage Classification: Medium duty, up to 12 cycles per hour and up to 50 cycles per day.
5. Operator Type: Manufacturer's standard for door requirements and clearances.
6. Motor: Reversible-type with controller (disconnect switch) for interior, clean, and dry motor exposure. Use adjustable motor-mounting bases for belt-driven operators.
 - a. Motor Size: **1/2 hp (373 W)**.
 - b. Electrical Characteristics:
 - 1) Phase: Single phase.
 - 2) Volts: 115 V.
7. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
8. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

- a. Monitored Entrapment Protection: Electric sensor edge on bottom section designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
9. Control Station: Surface mounted, three-position (open, close, and stop) control.
- a. Operation: Push button.
 - b. Interior-Mounted Unit: Full-guarded, surface-mounted, standard-duty, weatherproof-type, NEMA ICS 6, Type 4 enclosure.
10. Emergency Manual Operation: Chain type designed so required force for door operation does not exceed **35 lbf (155 N)**.
11. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
12. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- N. Metal Finish:
- 1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 MANUAL SECTIONAL-DOOR ASSEMBLY, TYPE K

- A. Steel Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist, and deformation; and complies with requirements in DASMA 102.
 - 1. Basis-of-Design Product: 591 Series Thermacore Insulated Steel Doors by Overhead Door Company or approved equal.
- B. Operation Cycles: Door components and operators capable of operating for not less than 25,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.
- C. Air Infiltration: Maximum rate of **0.8 cfm/sq. ft.** when tested in accordance with ASTM E283 or DASMA 105.
- D. U-Value: **0.07 Btu/sq. ft. x h x deg F.**
- E. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with hot-dipped galvanized zinc coating.
 - 1. Door-Section Thickness: **1-5/8 inches.**
 - 2. Section Faces:

- a. Thermal-Break Construction: Provide sections with continuous thermal-break construction separating the exterior and interior faces of door.
- b. Exterior Face: Fabricated from single sheets, not more than 24 inches (610 mm) high; with horizontal meeting edges rolled to continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove, weather- and pinch-resistant seals and reinforcing flange return.
 - 1) Steel Sheet Thickness: 0.015-inch nominal thickness.
 - 2) Surface: Manufacturer's standard, ribbed.
- c. Interior Face: Enclose insulation completely within steel exterior facing and interior facing material, with no exposed insulation. Provide the following interior-facing material:
 - 1) Zinc-Coated (Galvanized) Steel Sheet: 0.015-inch nominal thickness.
3. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.040-inch (1.02-mm) nominal coated thickness and welded to door section.
4. Section Reinforcing: Horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
 - a. Bottom Section: Reinforce section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal (weatherseal).
 - b. Hardware Locations: Provide reinforcement for hardware attachment.
5. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation of type indicated below:
 - a. Board Insulation: Polystyrene or polyurethane, secured to exterior face sheet.
 - b. Foamed-in-Place Insulation: Polyurethane, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load.
 - c. Fire-Resistance Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84.
- F. Track: Manufacturer's standard, galvanized-steel, vertical-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.
 1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 (Z180) zinc coating.
 2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings.
 3. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches (51 mm) apart for door-drop safety device.

- a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide intermittent jamb brackets attached to track and wall.
- G. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom top jambs of door.
- H. Windows: Manufacturer's standard window units of shape and size and in locations indicated on Drawings. Set glazing in vinyl, rubber, or neoprene glazing channel. Provide removable stops of same material as door-section frames. Provide the following glazing:
1. Clear Acrylic Plastic: 3 mm thick, transparent, smooth or polished, and formulated to be UV resistant. Provide double insulating units.
- I. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
1. Hinges: Heavy-duty, galvanized-steel hinges of not less than **0.079-inch (2.01-mm)** nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.
 - a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.
 2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.
 - a. Roller-Tire Material: Manufacturer's standard.
 3. Push/Pull Handles: Equip each door with galvanized-steel lifting handles on each side of door, finished to match door.
- J. Locking Device:
1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks, operable from inside only.
 2. Chain Lock Keeper: Suitable for padlock.
- K. Counterbalance Mechanism:
1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
 2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
 - a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
 3. Cables: Galvanized-steel, multistrand, lifting cables.

4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.
5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

L. Manual Door Operator:

1. Push-Up Operation: Lift handles and pull rope for raising and lowering doors located on inside and outside of bottom section; with counterbalance mechanism designed so that required lift or pull for door operation does not exceed [25 lbf (111 N)] <Insert value>.

M. Metal Finish:

1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.4 IMPACTABLE SECTIONAL-DOOR ASSEMBLY, TYPE I

- A. High-Impact Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist, and deformation; and complies with requirements in DASMA 102.
 1. Basis-of-Design Product: TKO Cruiserweight Dock Door, by TKO Dock Doors or approved equal.
- B. Operation Cycles: Door components and operators capable of operating for not less than 25,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.
- C. Air Infiltration: Maximum rate of 0.8 cfm/sq. ft. when tested in accordance with ASTM E283 or DASMA 105.
- D. U-Value: 0.010 Btu/sq. ft. x h x deg F .
- E. Aluminum Sections: ASTM B221 (ASTM B221M) extruded-aluminum stile and rail members of alloy and temper standard with manufacturer for type of use and finish indicated; in minimum thickness required to comply with requirements; with rail and stile dimensions and profiles indicated on Drawings; and with overlapped or interlocked weather- and pinch-resistant seal at meeting rails.
 1. Door-Section Thickness: 1-3/4 inches (44 mm).
 2. Section Reinforcing: Continuous horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Ensure that reinforcement does not obstruct vision lites.
 - a. Hardware Locations: Provide reinforcement for hardware attachment.

3. Insulated Aluminum Panels: **ASTM B209 (ASTM B209M)**, alloy and temper standard with manufacturer for use and finish indicated.
 - a. Description: 1-3/4 inch thick overall insulated panel composed of **0.030 inch** thick aluminum exterior panel and 0.090 inch thick high-impact polymer sheet interior panel with an extruded polystyrene core and co-extruded high-impact PVC edge capping with UV inhibitors.
 - 1) Extra-high impact panels: At bottom two panels of each door substitute manufacturer's ultra high-impact polymer sheet secured to the interior surface of the panel for increased damage resistance.
 - b. Aluminum Surface: Stucco embossed.
 - c. Window units: Manufacturer's standard, 1/2" thermal pane insulating tempered glass window unit mounted in molded high-impact polymer frame.
 - 1) Quantity: Two per door, refer to door types on drawings.
- F. Track: Manufacturer's standard, galvanized-steel, vertical-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.
 1. Material: Galvanized steel, ASTM A653/A653M, minimum **G60 (Z180)** zinc coating.
 2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings.
 3. Break away / knock out design: Impact-A-Track track design to be angled toward building exterior and wrap around hardware on the interior. This design to offer knockout capability towards exterior while still providing security. Door hardware is to ride in channel. Tracks to be securely mounted flush with door jamb to maintain full opening width.
 - a. Height: to minimum 6 feet above floor.
 4. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced **2 inches (51 mm)** apart for door-drop safety device.
 - a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide continuous angle attached to track and wall.
- G. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom top and jambs of door. Provide combination bottom weatherseal and sensor edge for bottom seal at motorized doors.
- H. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
 1. Hinges: Heavy-duty, galvanized-steel hinges of not less than **0.079-inch (2.01-mm)** nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.
 - a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.

2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.
 - a. Roller-Tire Material: Manufacturer's standard.
 3. Push/Pull Handles: At manual doors, equip each door with galvanized-steel lifting handles on each side of door, finished to match door.
- I. Locking Device:
1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks, located on single-jamb side, operable from inside only.
 2. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
- J. Counterbalance Mechanism:
1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
 2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
 - a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
 3. Cables: Galvanized-steel, multistrand, lifting cables.
 4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.
 5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
 6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.
- K. Manual Door Operator:
1. Locations: as indicated on drawings
 2. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum **25 lbf (111 N)** force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.
- L. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
1. Locations: as indicated on drawings
 2. Comply with NFPA 70.

3. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
4. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. (2.4 m) or lower. Insert requirements.
5. Usage Classification: Medium duty, up to 12 cycles per hour and up to 50 cycles per day.
6. Operator Type: Manufacturer's standard for door requirements and clearances.
 - a. Basis-of-Design:
7. Motor: Reversible-type with controller (disconnect switch) for interior, clean, and dry motor exposure. Use adjustable motor-mounting bases for belt-driven operators.
 - a. Motor Size: 1/2 hp (373 W).
 - b. Electrical Characteristics: Opera-HJ by Manaras.
 - 1) Phase: Single phase.
 - 2) Volts: 115 V.
8. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
9. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
 - a. Monitored Entrapment Protection: Electric sensor edge on bottom section designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
10. Control Station: Integrated with master control station for dock leveler, truck restraints and light communication system. See Section 11 1319 Stationary Loading Dock Equipment.
11. Emergency Manual Operation: Chain type designed so required force for door operation does not exceed 35 lbf (155 N).
12. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
13. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

M. Metal Finish:

1. Factory Prime Steel Finish: Compatible with field-applied finish and in manufacturer's standard color.
2. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing with fasteners spaced not more than **24 inches (610 mm)** apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install in accordance with UL 325.

3.2 DEMONSTRATION

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

END OF SECTION 083613

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SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors and door-frame units.

B. Related Sections:

1. Division 08 Section "Flush Wood Doors" for coordination with wood doors in aluminum frames.
2. Division 08 Section "Door Hardware" for coordination with door hardware.
3. Division 08 Section "Glazing" for glass and glazing of storefront framing.

1.2 DEFINITIONS

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

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Glass breakage
 - c. Thermal stresses transferring to building structure.
 - d. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - e. Noise or vibration created by wind and by thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant failure.

- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

- C. Structural Loads:
1. Wind Loads: As indicated on Drawings.
- D. Deflection of Framing Members:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch (19 mm), whichever is less.
 2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or $1/8$ inch, whichever is smaller.
- E. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft.
- F. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- G. Water Penetration under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.
- H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Low Exterior Ambient-Air Temperature: 0 deg F.
 3. Interior Ambient-Air Temperature: 75 deg F.
- I. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.45 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
 - 2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- C. Warranties: Sample of warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- C. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- D. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- E. Pre-installation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Deterioration of metals, and other materials beyond normal weathering.
 - c. Water leakage through fixed glazing and framing areas.
 - d. Failure of operating components.
 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
 1. Warranty Period: Five years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product (Exterior): Subject to compliance with requirements, provide Kawneer 451 UT thermally broken or comparable product meeting the performance characteristics of the specified product by one of the following:
1. Arch Aluminum & Glass Co., Inc.
 2. EFCO Corporation.
 3. TRACO.
 4. United States Aluminum.
 5. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
- B. Basis-of-Design Product (Interior): Subject to compliance with requirements, provide Kawneer 450 non-thermally broken or comparable product meeting the performance characteristics of the specified product by one of the following:
1. Arch Aluminum & Glass Co., Inc.
 2. EFCO Corporation.
 3. TRACO.
 4. United States Aluminum.
 5. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

- A. Exterior Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken, screw spline.

2. Profile: 4.5 inch depth with 2 inch sightline.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Glazing Plane: Center.
- B. Interior Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Non-Thermally broken, screw spline.
 2. Profile: 4.5 inch depth with 2 inch sightline.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Glazing Plane: Center.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use concealed fasteners. If exposed fasteners are required, use countersunk Phillips screw heads, finished to match framing system.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Kawneer wall wide stile 500 glazed entrance doors for manual-swing operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.090-inch thick, extruded-aluminum tubular rail and stile members. Corners shall be constructed using mechanical clip fastening, deep penetration plug welds and long fillet welds inside and outside all four corners. (Add No. One)

2. Door Design: Wide stile; 5-inch nominal width with minimum 10-inch bottom rail to meet ADA (match existing doors).
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide non-removable glazing stops on outside of door.
- B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

2.6 ACCESSORY MATERIALS

- A. Subsills: Manufacturer's thermally broken, extruded-aluminum high performance subsill that coordinates with selected window and storefront framing system. Subsill to be provided with attachment clips for securing framing system into subsill without penetration of the high-performance subsill. Subsill is to be provided with manufacturer's end dam clips. Basis of design: Kawneer HP subsill #452TCG037.
- B. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.
- C. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
- D. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.
- E. Flashings: Minimum 0.032 inch thick aluminum to match mullion sections where exposed.
- F. Aluminum Break Metal: Match aluminum storefront thickness and finish.

2.7 FABRICATION, STOREFRONT

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Storefront Framing: Fabricate components for assembly using screw-spline system.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At exterior doors, provide compression weather stripping at fixed stops.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
1. Color: Dark bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION STOREFRONT

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

6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior. Seal ends of subsill with silicone below end dams.
- D. Cut, miter and seal extruded aluminum subsill at changes in direction. **Install end dams on subsill per manufacturer's instructions. Seal to direct water out from system to exterior.**
- E. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- F. Install window framing system into subsill with manufacturer's clips not penetrating fasteners.
- G. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- H. Install glazing as specified in Division 08 Section "Glazing."
- I. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- J. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.3 INSTALLATION WINDOWS

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- F. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.4 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.5 ADJUSTING AND CLEANING

- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
 - 1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.
- B. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- C. Remove protective material from pre-finished aluminum surfaces.
- D. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- E. Remove excess sealant by method acceptable to sealant manufacturer that does not damage or mar aluminum finish.

END OF SECTION 084113

SECTION 085116 - ALUMINUM TRANSACTION WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes aluminum transaction windows.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 1years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ALUMINUM TRANSACTION WINDOWS

- A. Basis of Design Product: Subject to compliance with requirements, provide the following basis of design product, or an Architect approved equal:
 - 1. DW Series deluxe sliding service windows by C.R. Laurence Co., Inc.
 - 2. Configuration: DW4200K, as indicated on drawings.
- B. Materials:
 - 1. Frames: 4” Aluminum frame modules shall be constructed of 6063-T5 extruded aluminum. Replacement and servicing of glass shall be from the clerk side of the window

by means of an access panel in the top header and does not require the removal of the frame from the opening. Window glides on top-hung heavy-duty ball bearing slides. Poly-pile weather stripping and self-latching handle. Overall frame sizes are to be in accordance with the contract drawings AAMA/WDMA/CSA 101/I.S.2/A440 includes requirements for aluminum, thermal breaks, and other materials and window components. If more stringent requirements apply, insert them in this article.

2. Finish: All aluminum to be dark bronze anodized.
 3. Options:
 - a. Keyed Lock
 - b. Open counter for unobstructed transaction surface.
 4. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.
 - a. Kind: Fully tempered where indicated on Drawings and as required to meet code.
 - b. Thickness: 1/4 inch.
- C. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- D. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- E. Horizontal-Sliding Window Hardware:
1. Track: Designed to comply with performance requirements indicated and to allow an unobstructed transaction counter surface when the window is open.
 2. Locks and Latches: Operated from the inside only.
 3. Roller Assemblies: Low-friction design.
- F. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- 2.2 FABRICATION
- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
 - B. Glaze aluminum windows in the factory.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085113

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SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
2. Electronic access control system components
3. Key control cabinet for fire department access (Knox Box)

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
4. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Interior Aluminum Doors and Frames"
 - d. "Aluminum-Framed Entrances and Storefronts"
5. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
6. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 1784 - Air Leakage Tests of Door Assemblies
2. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Bundled Submittal: Make submittal related to Sections listed below in a single package. Include product data, shop drawings, and schedule data.
 - a. Section 08 1113 – Hollow Metal Doors and Frames
 - b. Section 08 4113 – Aluminum Framed Entrances and Storefronts
 - c. Section 08 1416 – Flush Wood Doors
 - d. Section 08 7100 – Door Hardware
 - e. Division 28 sections for Access Control
- 3.
4. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.

3. Door Hardware Schedule:

- a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
- b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
- c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

4. Key Schedule:

- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
5. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Provide Product Data:

- a. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Factory order acknowledgement numbers (for warranty and service)
 - d. Name, address, and phone number of local representative for each manufacturer.
 - e. Parts list for each product.
 - f. Final approved hardware schedule edited to reflect conditions as installed.
 - g. Final keying schedule
 - h. Copies of floor plans with keying nomenclature
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - j. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

1.04 QUALITY ASSURANCE**A. Qualifications and Responsibilities:**

1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 - a. Warehousing Facilities: In Project's vicinity.
 - b. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - c. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies like those indicated for this Project.
 - d. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - 1) Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

C. Pre-Installation Meetings

1. Keying Conference

- a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.

2. Pre-installation Conference

- a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- b. Inspect and discuss preparatory work performed by other trades.
- c. Inspect and discuss electrical roughing-in for electrified door hardware.
- d. Review sequence of operation for each type of electrified door hardware.
- e. Review required testing, inspecting, and certifying procedures.
- f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

- a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

1.06 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Falcon: 10 year
 - 2) Exit Devices
 - a) Falcon: 10 year
 - 3) Closers
 - a) LCN 4050 Series: 25 year
 - b) LCN 1450 Series: 25 year
 - 4) Automatic Operators
 - a) LCN: 2 year
 - 5) Accessories
 - a) Ives Continuous Hinges: Lifetime

1.08 MAINTENANCE

- A. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

- B. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect’s approval.

2.02 MATERIALS

A. Fasteners

- 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

- 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

- 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
- 2. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
- 2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series

- b. McKinney TB/T4B series
- c. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Select
 - b. Stanley
 - c. ABH

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.

2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives, DCI
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood
 - c. DCI

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon T series
2. Acceptable Manufacturers and Products:
 - a. Corbin-Russwin CL3300 series
 - b. Sargent 10-Line

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.

2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: Dane.

2.07 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon 24/25 series
2. Acceptable Manufacturers and Products:
 - a. Sargent 19-43-GL-80 series
 - b. Precision Apex series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer’s approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.08 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 6000 Series.
2. Acceptable Manufacturers and Products:
 - a. Folger Adam 300 Series
 - b. HES 1006 Series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.09 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 R
2. Acceptable Manufacturers and Products:
 - a. Best CorMax
 - b. Kaba Peaks
 - c. Medeco X4

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Conventional Patented Restricted Small Format: cylinder with small format interchangeable cores (SFIC) with restricted, patented keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

C. Construction Keying:

1. Replaceable Construction Cores.
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 3 construction control keys
 - 2) 12 construction change (day) keys.
 - b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.10 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.
 2. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - b. Patent Protection: Keys and blanks protected by one or more utility patent(s).
 4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.
 - c. Master Keys: 6.

2.11 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series
2. Acceptable Manufacturers and Products:
 - a. Falcon SC70A series
 - b. Norton 7500 series
 - c. Sargent 351 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.12 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 1450 series
2. Acceptable Manufacturers and Products:
 - a. Falcon SC80A series
 - b. Norton 8000 series
 - c. Sargent 1331 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.

2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-3/8-inch (35 mm) diameter with 5/8-inch (16 mm) diameter pinion journal diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Pressure Relief Valve (PRV) Technology: Not permitted.
7. Provide stick on and special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.13 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4600 series
2. Acceptable Manufacturers and Products:
 - a. Norton 6000 series
 - b. Precision D4990 series
 - c. Besam Power Swing

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide hard-wired actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
9. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.

10. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.14 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives.
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Burns
 - c. Rockwood

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.15 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. Rockwood

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Size plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.16 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

- a. Glynn-Johnson
- 2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent
 - c. ABH
- B. Requirements:
 - 1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
 - 2. Provide friction type at doors without closer and positive type at doors with closer.

2.17 DOOR STOPS AND HOLDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Trimco
 - b. Burns
 - c. Rockwood
- B. Provide door stops at each door leaf:
 - 1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
 - 2. Where a wall stop cannot be used, provide universal floor stops.
 - 3. Where wall or floor stop cannot be used, provide overhead stop.
 - 4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.18 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Zero International & National Guard
 - 2. Acceptable Manufacturers:
 - a. Reese
 - b. Pemko
- B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.19 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood
 - c. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.20 LATCH PROTECTORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. Rockwood

B. Provide primed for pain latch protectors of type required to function with specified lock.

1. Paint latch protector to match hardware finish.

2.21 FINISHES

- A. Finish: As specified in the hardware sets.

2.22 HIGH SECURITY EMERGENCY KEY BOX

- A. Products that may be incorporated into the Work:
 - 1. Knox, Inc. 3200 Series x RMK
 - 2. Substitutions as approved by Architect/Owner
- B. Requirements:
 - 1. Provide recess-mounted emergency key box as approved by the local fire jurisdiction. Key box to be master-keyed as dictated by local fire jurisdiction.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- H. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- I. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- K. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- L. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- M. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- N. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- O. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- P. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to

operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

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

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

Hardware Group No. 01

For use on Door #(s):

101

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONTINUOUS HINGE	112XY (MATCH STOREFRONT FINISH)		IVE
1	EA	KEYED REMOVABLE MULLION	KR4854B STAB (49/80350) (RAL 9005)	BLK	VON
1	EA	PANIC HARDWARE	25-R-EO	622	FAL
1	EA	PANIC HARDWARE	25-R-NL-OP	622	FAL
1	EA	SFIC MORTISE CYLINDER (W/ CONSTRUCTION CORE)	80-132	622	SCH
1	EA	SFIC RIM CYLINDER (W/ CONSTRUCTION CORE)	80-159	622	SCH
2	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O	BLK	IVE
1	EA	OH STOP	100S ADJ	BLK	GLY
1	EA	OH STOP	100SE ADJ USE W/ AUTO OP	BLK	GLY
1	EA	SURFACE CLOSER	4050A EDA	693	LCN
1	SET	CLOSER BRACKET(S)	AS REQ'D TO INSTALL CLOSER	693	LCN
1	EA	SURF. AUTO OPERATOR	4642 120 VAC FLUSH CEILING MOUNT	693	LCN
1	SET	AUTO OP BRACKET(S)	AS REQUIRED TO INSTALL AUTO OP	693	LCN
1	EA	WEATHER RING	8310-801	PLA	LCN
1	EA	4.75" HARDWIRE SQUARE ACTUATOR	8310-853T	630	LCN
1	EA	FLUSH MOUNT BOX	8310-867F	689	LCN
1	EA	VESTIBULE ACTUATOR	INCLUDED WITH OPENING 102		
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	MEETING STILE SEAL	PROVIDED BY ALUM DOOR/FRAME MFG		
1	SET	SEALS	PROVIDED BY ALUM DOOR/FRAME MFG		
2	EA	DOOR SWEEP	PROVIDED BY ALUM DOOR/FRAME MFG		
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

AUTOMATIC OPERATOR REQUIRES 120V
 DURING OPEN HOURS: DOORS CAN BE DOGGED FOR PUSH / PULL OPERATION. NOTE: AUTOMATIC OPERATOR WILL ONLY OPERATE IF LATCH IS RETRACTED OR ELECTRIC STRIKE IS DISABLED.
 DURING CLOSED HOURS: KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED. AUTHORIZED CREDENTIAL MOMENTARILY ENABLES EXTERIOR ACTUATOR AND RELEASES STRIKE ALLOWING ENTRY.
 ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM REMAINS SECURE.
 FREE EGRESS AT ALL TIMES AND VESTIBULE ACTUATOR IS ALWAYS ENABLED. IF DOOR IS LATCHED WHEN ENABLED ACTUATOR IS DEPRESSED, OPERATOR RELEASES ELECTRIC STRIKE PRIOR TO OPENING.

Hardware Group No. 02
 For use on Door #(s):

102

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONTINUOUS HINGE	112XY (MATCH STOREFRONT FINISH)		IVE
2	EA	DUMMY PUSH BAR	250EO	622	FAL
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O	BLK	IVE
1	EA	OH STOP	100S ADJ	BLK	GLY
1	EA	OH STOP	100SE ADJ USE W/ AUTO OP	BLK	GLY
1	EA	SURFACE CLOSER	4050A EDA	693	LCN
1	SET	CLOSER BRACKET(S)	AS REQ'D TO INSTALL CLOSER	693	LCN
1	EA	SURF. AUTO OPERATOR	4642 120 VAC FLUSH CEILING MOUNT	693	LCN
1	SET	AUTO OP BRACKET(S)	AS REQUIRED TO INSTALL AUTO OP	693	LCN
1	EA	4.75" HARDWIRE SQUARE ACTUATOR	8310-853T	630	LCN
1	EA	DUAL VESTIBULE ACTUATOR, WALL MOUNT	8310-855	630	LCN
2	EA	FLUSH MOUNT BOX	8310-867F	689	LCN
1	SET	SEALS	PROVIDED BY ALUM DOOR/FRAME MFG		
2	EA	DOOR SWEEP	PROVIDED BY ALUM DOOR/FRAME MFG		

AUTOMATIC OPERATOR REQUIRES 120V
 PUSH / PULL OPERATION.
 ACTUATORS ALWAYS ENABLED.

Hardware Group No. 03

For use on Door #(s):

104

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	CONTINUOUS HINGE	112XY (MATCH STOREFRONT FINISH)		IVE
1	EA	ENTRY LOCK	T501H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	SET	CLOSER BRACKET(S)	AS REQ'D TO INSTALL CLOSER	693	LCN
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	SET	ACOUSTIC SEALS & SWEEPS	PROVIDED BY ALUM DOOR/FRAME MFG		

Hardware Group No. 03.1 - Not Used

Hardware Group No. 04

For use on Door #(s):

105

129A

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	PANIC HARDWARE	25-R-NL	622	FAL
1	EA	SFIC MORTISE CYLINDER (W/ CONSTRUCTION CORE)	80-132	622	SCH
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ STOP)	4050A CUSH	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

Hardware Group No. 04.1

For use on Door #(s):

155C 155D

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	PANIC HARDWARE	25-R-NL	622	FAL
1	EA	SFIC MORTISE CYLINDER (W/ CONSTRUCTION CORE)	80-132	622	SCH
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4050A SCUSH	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

Hardware Group No. 04B

For use on Door #(s):

139A

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	PANIC HARDWARE	25-R-NL	622	FAL
1	EA	SFIC MORTISE CYLINDER (W/ CONSTRUCTION CORE)	80-132	622	SCH
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER (W/ HOLD-OPEN)	4050A HEDA	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED. AUTHORIZED CREDENTIAL MOMENTARILY RELEASES STRIKE ALLOWING ENTRY.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM REMAINS SECURE.

Hardware Group No. 05

For use on Door #(s):

107

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PASSAGE SET	T101 DAN	622	FAL
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 05B

For use on Door #(s):

131 148B

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PASSAGE SET	T101 DAN	622	FAL
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER

Hardware Group No. 06

For use on Door #(s):

146

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 07

For use on Door #(s):

109 127

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	OH STOP	90S	BLK	GLY
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 08

For use on Door #(s):

110 111

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PUSH PLATE	8200 6" X 16"	BLK	IVE
1	EA	PULL PLATE	8302 10" 6" X 16"	BLK	IVE
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	MOP PLATE	8400 6" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER

Hardware Group No. 09

For use on Door #(s):

112 121 128

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	613	VON
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED. AUTHORIZED CREDENTIAL MOMENTARILY RELEASES STRIKE ALLOWING ENTRY.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM REMAINS SECURE.

Hardware Group No. 10

For use on Door #(s):

145A 145B 201

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	ENTRY LOCK	T501H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER

Hardware Group No. 10.1

For use on Door #(s):

139E

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	613	VON
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED. AUTHORIZED CREDENTIAL MOMENTARILY RELEASES STRIKE ALLOWING ENTRY.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM REMAINS SECURE.

Hardware Group No. 11

For use on Door #(s):

114	115	116	117	118	119
120	122	123	124	125	126
202	203				

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	ENTRY / OFFICE LOCK	T511H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 12

For use on Door #(s):

130

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONTINUOUS HINGE	112XY (MATCH STOREFRONT FINISH)		IVE
1	EA	REMOVABLE MULLION	4854B STAB (49/80350) (RAL 9005)	BLK	VON
1	EA	PANIC HARDWARE	25-R-EO	622	FAL
1	EA	PANIC HARDWARE	25-R-NL-OP	622	FAL
1	EA	SFIC RIM CYLINDER (W/ CONSTRUCTION CORE)	80-159	622	SCH
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O	BLK	IVE
1	EA	SURFACE CLOSER	4050A RW/PA	693	LCN
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4050A SCUSH	693	LCN
2	SET	CLOSER BRACKET(S)	AS REQ'D TO INSTALL CLOSER	693	LCN
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	SEALS	PROVIDED BY ALUM DOOR/FRAME MFG		
2	EA	DOOR SWEEP	PROVIDED BY ALUM DOOR/FRAME MFG		
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED.
 AUTHORIZED CREDENTIAL MOMENTARILY RELEASES STRIKE ALLOWING ENTRY.
 ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM
 REMAINS SECURE.

Hardware Group No. 12.1 - Not Used

Hardware Group No. 13

For use on Door #(s):

132 133

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PRIVACY LOCK	T301S DAN	622	FAL
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	MOP PLATE	8400 6" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER

Hardware Group No. 13.1

For use on Door #(s):

147

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PRIVACY LOCK	T301S DAN	622	FAL
1	EA	OH STOP	90S	BLK	GLY
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	MOP PLATE	8400 6" B-CS	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER

Hardware Group No. 14

For use on Door #(s):

134 141B

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	DORMITORY LOCK	T571H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 15

For use on Door #(s):

135

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	ENTRY / OFFICE LOCK	T511H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	1450 SCUSH FC	693	LCN
1	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 16

For use on Door #(s):

113

156

170

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
2	EA	MANUAL FLUSH BOLT	FB458	622	IVE
1	EA	DUST PROOF STRIKE	DP1 / DP2 AS REQ'D	BLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ HOLD-OPEN)	1450 HEDA FC	693	LCN
1	EA	DOOR HOLDER	PAH60	693	LCN
2	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
2	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 16.1

For use on Door #(s):

136B

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
2	EA	MANUAL FLUSH BOLT	FB458	622	IVE
1	EA	DUST PROOF STRIKE	DP1 / DP2 AS REQ'D	BLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	OH STOP & HOLDER	90H	BLK	GLY
1	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
2	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	MEETING STILE SEAL	5060B	BK	NGP
2	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER

Hardware Group No. 16.2

For use on Door #(s):

143

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
2	EA	MANUAL FLUSH BOLT	FB458	622	IVE
1	EA	DUST PROOF STRIKE	DP1 / DP2 AS REQ'D	BLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ HOLD-OPEN)	1450 HEDA FC	693	LCN
1	EA	DOOR HOLDER	PAH60	693	LCN
2	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
2	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	MEETING STILE SEAL	5060B	BK	NGP
2	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

Hardware Group No. 17

For use on Door #(s):

136A

139C

141C

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	PUSH PLATE	8200 6" X 16"	BLK	IVE
1	EA	PULL PLATE	8302 10" 6" X 16"	BLK	IVE
1	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	MOP PLATE	8400 6" B-CS	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 18

For use on Door #(s):

139D

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
2	EA	PUSH PLATE	8200 6" X 16"	BLK	IVE
2	EA	PULL PLATE	8302 10" 6" X 16"	BLK	IVE
2	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
4	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 18.1

For use on Door #(s):

141D

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
2	EA	PUSH PLATE	8200 6" X 16"	BLK	IVE
2	EA	PULL PLATE	8302 10" 6" X 16"	BLK	IVE
1	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
1	EA	SURFACE CLOSER (W/ HOLD-OPEN)	1450 HEDA FC	693	LCN
4	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 19

For use on Door #(s):

141A

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
2	EA	MANUAL FLUSH BOLT	FB458	622	IVE
1	EA	DUST PROOF STRIKE	DP1 / DP2 AS REQ'D	BLK	IVE
1	EA	DORMITORY LOCK	T571H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
2	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
2	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	MEETING STILE SEAL	5060B	BK	NGP
2	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER

Hardware Group No. 20

For use on Door #(s):

141E 141F

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	SET	CONSTANT LATCHING FLUSH BOLT	845/945 AS REQ'D BY DOOR MATERIAL	BLK	DCI
1	EA	DUST PROOF STRIKE	DP1 / DP2 AS REQ'D	BLK	IVE
1	EA	PASSAGE SET	T101 DAN	622	FAL
1	EA	COORDINATOR	COR X FL X MB AS REQ'D	711	IVE
2	EA	SURFACE CLOSER (W/ HOLD-OPEN)	1450 HEDA FC	693	LCN
2	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
2	EA	ARMOR PLATE	8400 34" B-CS	630	IVE
2	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	488S @ HEAD & JAMBS	BK	ZER
1	EA	MEETING STILE SEAL	5060B	BK	NGP
2	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	1/4" HIGH BY 4" DEEP SADDLE THRESHOLD	544A	A	ZER

Hardware Group No. 21

For use on Door #(s):

144A 144B

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER (W/ STOP & HOLD-OPEN)	1450 HCUSH FC	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

Hardware Group No. 22

For use on Door #(s):

152A 155A

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	PANIC HARDWARE	25-R-NL	622	FAL
1	EA	SFIC MORTISE CYLINDER (W/ CONSTRUCTION CORE)	80-132	622	SCH
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER (W/ STOP)	4050A CUSH	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED. AUTHORIZED CREDENTIAL MOMENTARILY RELEASES STRIKE ALLOWING ENTRY.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM REMAINS SECURE.

Hardware Group No. 23

For use on Door #(s):

148A

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	ELECTRIC HINGE	5BB1 (SIZE, QTY, WEIGHT AS REQ'D) TW8	BBLK/62 2	IVE
1	EA	FAIL SECURE ELEC LOCK	T881H7 DAN 12/24 VDC	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	LOCK GUARD	LG12 (PAINT TO MATCH HARDWARE)	600	IVE
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4050A SCUSH	693	LCN
1	EA	KICK PLATE	8400 10" B-CS	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER
1		LOW VOLTAGE POWER*	PROVIDED BY DIVISION 28		
1	EA	CARD READER*	PROVIDED BY DIVISION 28 - MTB11 / MTB15 OR AS REQ'D - 5VDC - 28VDC	BLK	SCE
1	SET	WIRING, PT TO PT DIAGRAM & ELEVATION DIAGRAM	PROVIDED BY HARDWARE SUPPLIER		

FREE EGRESS AT ALL TIMES.

KEY IN OUTSIDE TRIM RETRACTS LATCH FOR ENTRY ONLY. DOOR RE-SECURES WHEN KEY IS REMOVED.

AUTHORIZED CREDENTIAL MOMENTARILY RELEASES OUTSIDE LEVER ALLOWING ENTRY.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS POSITIVELY LATCHED AND TRIM
REMAINS SECURE.

Hardware Group No. 23.2 - Not Used

Hardware Group No. 25

For use on Door #(s):

157

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	EXTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	BBLK	IVE
1	EA	STOREROOM LOCK	T581H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	693	LCN
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
1	EA	GASKETING	429BK @ HEAD & JAMBS	BK	ZER
1	EA	DOOR SWEEP	39BK	BK	ZER
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

Hardware Group No. 26

For use on Door #(s):

204

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	SET	INTERIOR BALL BEARING HINGE	5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)	FBLK	IVE
1	EA	CLASSROOM LOCK	T561H7 DAN	622	FAL
1	EA	SFIC EVEREST CORE	80-037	622	SCH
1	EA	WALL STOP	WS406/407 (CCV / CVX AS REQ'D)	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 27

For use on Door #(s):

001 002

Provide each door(s) with the following:

<u>QTY</u>	<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
HARDWARE BY GATE FABRICATOR				
<input type="checkbox"/> WELD-ON BARREL HINGES, 3 PER LEAF, GATE FABRICATOR SHALL VERIFY HINGES ARE RATED FOR WEIGHT OF GATES.				
<input type="checkbox"/> HASP, ONE PER PAIR, STAINLESS STEEL, TO ACCEPT PADLOCK BY OWNER.				
<input type="checkbox"/> CANE BOLT, ONE PER LEAF				

Hardware Group No. 28

For use on Door #(s):

137 150 153A 153B 153C 153D
154A 154B 154C

Provide each door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	SADDLE THRESHOLD	1/2" HIGH - WIDTH AS REQUIRED BY SILL DETAIL	A	ZER

ALL HARDWARE PROVIDED BY REFRIGERATION SUPPLIER

Hardware Group No. 29

For use on Door #(s):

138A 138B

Provide each door(s) with the following:

<u>QTY</u>	<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
	ALL HARDWARE PROVIDED BY REFRIGERATION SUPPLIER			

Hardware Group No. 31

For use on Door #(s):

149

Provide each door(s) with the following:

<u>QTY</u>	<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
	ALL HARDWARE PROVIDED BY REFRIGERATION SUPPLIER			

Hardware Group No. 32

For use on Door #(s):

129B 129C 139B 152B 152C 152D
 152E 152F 152G 155B

Provide each door(s) with the following:

<u>QTY</u>	<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
	ALL HARDWARE BY OVERHEAD DOOR MANUFACTURER			

Door Numbers	HwSet#
001	27
002	27
101	01
102	02
104	03
105	04
107	05
109	07
110	08
111	08
112	09
113	16
114	11
115	11
116	11
117	11
118	11
119	11
120	11
121	09
122	11
123	11
124	11
125	11
126	11
127	07
128	09
129A	04
129B	32
129C	32
130	12
131	05B
132	13
133	13
134	14
135	15
136A	17
136B	16.1
137	28
138A	29
138B	29
139A	04B
139B	32
139C	17
139D	18
139E	10.1
141A	19
141B	14
141C	17
141D	18.1
141E	20
141F	20
143	16.2
144A	21
144B	21
145A	10

Door Numbers	HwSet#
145B	10
146	06
147	13.1
148A	23
148B	05B
149	31
150	28
151	16
152A	22
152B	32
152C	32
152D	32
152E	32
152F	32
152G	32
153A	28
153B	28
153C	28
153D	28
154A	28
154B	28
154C	28
155A	22
155B	32
155C	04.1
155D	04.1
156	16
157	25
201	10
202	11
203	11
204	26

END OF SECTION 01 4000

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SECTION 08 8000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for windows, doors, storefront framing, glazed curtain walls, and sloped glazing.
2. Glazing sealants and accessories.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.4 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Cardinal Glass Industries
2. Guardian Industries Corp
3. Pilkington North America.
4. PPG.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Snow Loads: As indicated on Drawings.
3. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as **Btu/sq. ft. x h x deg F (W/sq. m x K)**.
2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.5 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.
 1. Sealing System: Dual seals.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

2.6 GLAZING SEALANTS

- A. General:
 1. Compatibility: Compatible with one another and with other materials they 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. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations.

- 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:
 - a. Dow Corning Corporation; Dow Corning® 791 Silicone Weatherproofing Sealant or Dow Corning® 795 Silicone Building Sealant.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS9000 SilPruf NB or UltraPruf II SCS2900.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295.
 - d. Pecora Corporation; 864NST, 895NST, or 898NST.
 - e. Sika Corporation; Sikasil WS-295.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- 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.

PART 3 - EXECUTION

3.1 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. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. 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.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
- G. 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.

3.2 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, then to jambs. Cover horizontal framing joints by applying tapes to jambs, 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. 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.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. 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.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.6 MONOLITHIC GLASS SCHEDULE

- A. Glass Type GL-1: Clear float glass.
 - 1. Minimum Thickness: 6 mm.
- B. Glass Type GL-2: Clear fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.

3.7 INSULATING GLASS SCHEDULE

- A. Glass Type GL-3: Low-E-coated, clear insulating glass.
 - 1. Basis-of-Design Product: Guardian insulating units with SunGuard Super Neutral (SN) 54 coating on 2nd surface.
 - 2. Overall Unit Thickness: 1 inch (25 mm).
 - 3. Minimum Thickness of Each Glass Lite: 6 mm.
 - 4. Outdoor Lite: Float glass or fully tempered float glass where indicated or required.
 - 5. Interspace Content: Air.
 - 6. Indoor Lite: Float glass or fully tempered float glass.
 - 7. Low-E Coating: Sputtered on second surface.
 - 8. Winter Nighttime U-Factor: 0.29 maximum.
 - 9. Summer Daytime U-Factor: 0.27 maximum.
 - 10. Visible Light Transmittance: 54 percent.
 - 11. Solar Heat Gain Coefficient: 0.28 maximum.
 - 12. Safety glazing where indicated or required.

END OF SECTION 08 8000

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SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior gypsum ceilings and soffits.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
 - 1. Minimum Base-Metal Thickness: 25 Gauge EQ (0.015 inch).
 - 2. Depth: As indicated on Drawings.
- B. Slip-Type Head Joints: Where indicated, or where the top of and interior partition is attached to floor or roof structure above, provide one of the following in thickness not less than indicated for studs and in width to accommodate depth of studs:
 - 1. Double-Runner System: ASTM C 645 top runners, inside runner with 51-mm- (2-inch-) deep flanges and fastened to studs, and outer runner sized to friction fit inside runner.
 - 2. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
- C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Minimum Base-Metal Thickness: 20 gauge.

2.2 SUSPENSION SYSTEM (Contractor's Option 1)

- A. Pre-manufactured suspended ceiling system by DONN Drywall Suspension Systems as manufactured by DONN Corporation or by Architect approved equal.
- B. Suspension system shall support the ceiling assembly, including 5/8 inch type X gypsum board with a maximum deflection of 1/360 of the span.
- C. The system shall consist of the following components:
 - 1. Main Tees: 12'-0" in length and 1-1/2 inches in height with a double web design and a rectangular bulb, a 1-1/2 inch flange with a rolled cap, cross tee holes located on four-

inch centers, hanger holes located on two-inch centers, and with an integral reversible splice.

2. Cross Tees: 4'-0" in length and 1-1/2 inches in height with a double web design and a rectangular bulb; 1-1/2 inch flange with a rolled cap, and with the web extended and formed to provide a clenched high tensile steel end for positive mechanical interlock with main tees.
3. Wall Track: 12'-0" in length formed in a channel shape with a 1-9/16 inch I.D. and 1-inch legs.

2.3 SUSPENSION SYSTEMS (Contractor's Option 2)

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 1.59-mm- (0.062-inch-) diameter wire, or double strand of 1.21-mm- (0.048-inch-) diameter wire.
- B. Hanger Attachments to Concrete:
 1. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 4.12 mm (0.16 inch) in diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 1.34 mm (0.053 inch) and minimum 13-mm- (1/2-inch-) wide flanges.
 1. Depth: 38 mm (1-1/2 inches).
- E. Furring Channels (Furring Members):
 1. Cold-Rolled Channels: 1.34-mm (0.053-inch) uncoated-steel thickness, with minimum 13-mm- (1/2-inch-) wide flanges, 19 mm (3/4 inch) deep.
 2. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
 - a. Minimum Base-Metal Thickness: 0.68 mm (0.027 inch).
 - b. Depth: 41 mm (1-5/8 inches).
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 22 mm (7/8 inch) deep.
 - a. Minimum Base-Metal Thickness: 0.84 mm (0.033 inch).
 4. Resilient Furring Channels: 13-mm- (1/2-inch-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide foam gasket.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: 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.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: 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.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 610 mm (24 inches) o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 3 mm (1/8 inch) from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- 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 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 suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - 3. Do not attach hangers to steel roof deck.
 - 4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 - 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Installation Tolerances: Install suspension systems that are level to within 3 mm in 3.6 m (1/8 inch in 12 feet) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Interior gypsum board at water proof FRP system.
 - 3. Tile backing panels.
 - 4. Texture finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples:
 - 1. Textured Finishes: 36-inch by 36-inch panel for each textured finish indicated and on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. Lafarge North America Inc.
 - 5. National Gypsum Company.
 - 6. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 15.9 mm (5/8 inch).
 2. Long Edges: Tapered.
- C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 15.9 mm (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.
- 2.3 BACKING FOR FRP PANELS AT WATERPROOF LOCATIONS (CLEANROOM, DEHYDRATORS, JANITOR CLOSET AND TOTE CLEANING)
- A. Basis-of-Design James Hardie, Hardie Backer Cement Board with Hydro Defense Technology. Meets ANSI A118.10 for waterproofness. 0.42 inch thick with mortar joint compound and glass fiber tape for finishing to a level 2 finish.
- 2.4 TILE BACKING PANELS AND BACKING FOR FRP AT WATER RESISTANT LOCATIONS (KITCHEN AND LOAD OUT)
- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corp.; GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 2. Core: 15.9 mm (5/8 inch), Type X.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 4. Location: Use tile backing panels as substrate to all wall tile.
- 2.5 TRIM ACCESSORIES
- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - 1) L Trim Molding at Corridor Coves: Fry Reglet DRML-625 or equivalent.
 - d. Expansion (control) joint. Clark Dietrich #093 Zinc Control Joint for Drywall or equivalent.
 - e. Z Reveal Molding at Restroom Coves: Fry Reglet DRMZ-625-375 or equivalent.
- 2.6 JOINT TREATMENT MATERIALS
- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:

1. Interior Gypsum Board: Paper.
 2. Interior Cement Board: Fiberglass
 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.7 AUXILIARY MATERIALS

- A. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- B. Sound Attenuation Blankets: At wall types indicated, use unfaced, fiberglass thermal insulation; full thickness of wall framing.
- C. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AIS-919.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Thermal Insulation: As specified in Section 07 2100 "Thermal Insulation."

2.8 TEXTURE FINISHES

- A. Primer: USG "First Coat" or equal as recommended by texture manufacturer.
- B. Non-Aggregate Finish: Skip trowel finish.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 6.4- to 12.7-mm- (1/4- to 1/2-inch-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- D. Install 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.
 - 1. Aluminum Trim: Install in locations indicated on Drawings.
 - 2. Control Joints: Install control joints at locations indicated on Drawings.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Panels that are substrate for FRP.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - 5. Level 5: Smooth texture at owner furnished graphic walls. These locations are all walls in Vestibule 101, Lobby 102, Reception 103, Hall 105, and Hospitality Area 106. At Volunteer Area 128 North and West Walls only.
- H. Texture Finish Application: Refer to section 09 9123-Interior Painting.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 2900

SECTION 09 3013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Crack isolation membrane.
3. Waterproof membrane.
4. Metal edge strips.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. ft.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer meets the quality and workmanship of a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup of each type of floor tile installation.
 2. Build mockup of each type of wall tile installation.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics 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 TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

- A. Ceramic Tile Type, T1 & T2: Glazed porcelain floor and wall tile.
1. Basis-of-Design: Interceramic Modulor.
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: 12 inches by 24 inches
 4. Face Size Variation: Rectified.
 5. Thickness: 3/8 inch.
 6. Face: Plain with square edges.
 7. Tile Color, Glaze, and Pattern: As indicated on drawings.
 8. Grout Color: As scheduled on drawings.
- B. Ceramic Tile Type, T3: Glazed porcelain accent wall tile.
1. Basis-of-Design: Mosa Murals Change.
 - a. Contact Carolyn Bailey, Crossville Studios, 303.902.9108 or cbailey@crossvillestudios.com.
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: 6 inches by 6 inches nominal size (15cm x 15cm).
 4. Face Size Variation: Rectified.
 5. Thickness: 0.28 inches (7mm).
 6. Face: Plain with square edges.
 7. Tile Color, Glaze, and Pattern: As indicated on drawings.
 8. Grout Color: As scheduled on drawings.
- C. Ceramic Tile Type, T4: Glazed porcelain mosaic floor tile.
1. Basis-of-Design: Interceramic Modulor.
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: 6 inches by 1 inch nominal size on 11 3/4" x 11 3/4" sheet

4. Face Size Variation: Rectified.
5. Thickness: 0.22 inches (5.6mm).
6. Face: Plain with square edges.
7. Tile Color, Glaze, and Pattern: As indicated on drawings.
8. Grout Color: As scheduled on drawings.

2.1 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 1. Products: Subject to compliance with the requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Mapei Aqua Defense
 - 1) Install per manufacturer's recommendations and with recommended accessories for a waterproof installation.

2.2 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 1. Products: Subject to compliance with requirements, provide Mapei Mapelastic AquaDefense or Architect approved equivalent by:
 - a. Bostik, Inc.; Durabond D-222 Duraguard Membrane.
 - b. Laticrete International, Inc.; Laticrete Hydro Ban.

2.3 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
 1. Manufacturers: Subject to compliance with requirements, provide Mapei Kerabond/Keralastic or Architect approved equivalent by:
 - a. Bostik, Inc.
 - b. Laticrete International, Inc.
 2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
 4. For wall applications, provide nonsagging mortar.

2.4 GROUT MATERIALS

- A. Water-Cleanable Epoxy Grout: ANSI A118.3.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide MAPEI Corporation; Kerapoxy CQ or an Architect approved comparable product by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 - c. TEC; H.B. Fuller Construction Products Inc.

2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schluter Systems Profiles as follows or equivalent by the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc
 - 2. Tile (T) to Polished or Sealed Concrete (PCONC or SCONC) – Schluter Reno-U EBU100 Brushed Stainless Steel 304.
- C. Metal Edge Trim for Wall Tile: Schluter Rondec RO 100 EB; Brushed Stainless Steel. Provide at outside corners, top of wainscot and all exposed tile edges. Provide manufacturer's connectors, inside corner and outside corner parts as required for complete installation.
- D. Movement Joint Sealant: Basis-of-Design product: Subject to compliance with the requirements, provide Mapei Mapesil or equivalent. Provide movement joint sealant at all perimeter joints (inside corners) at 1/8" width minimum and other areas as noted on the drawings.

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 the Work.
 - 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 comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

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

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. 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.
- C. 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.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- 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. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths: 1/8 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

- I. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- J. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- K. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Ceramic Tile Installation at concrete floors: TCNA F115; thinset mortar; epoxy grout.
 - a. Ceramic Tile Type: T1.
 - b. Waterproof membrane.
 - c. Thinset Mortar: Standard dry-set mortar.
 - d. Grout: Water-cleanable epoxy grout.
- B. Interior Wall Installations, Wood or Metal Studs or Furring:
 - 1. Ceramic Tile Installation: TCNA W245-15 or TCNA W248-15; thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: Glazed Wall Tile T2 & T3.
 - b. Thinset Mortar: Latex- portland cement mortar.
 - c. Grout: Water-cleanable epoxy grout.
- C. Shower Receptor and Wall Installations:
 - 1. Ceramic Tile Installation, Metal Studs: TCNA B420; thinset mortar on waterproof membrane over coated glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: T4 & T3.
 - b. Waterproof membrane, floors and walls.
 - c. Thinset Mortar / Mortar: Latex-portland cement mortar.
 - d. Grout: Water-cleanable epoxy grout.
 - e. Membrane: Fluid-Applied Membrane, Waterproof.

END OF SECTION 09 3013

SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.
- B. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- B. Acoustical Panel Standard: Comply with ASTM E 1264.
- C. Metal Suspension System Standard: Comply with ASTM C 635.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.3 ACOUSTICAL PANELS – APC1

- A. Basis-of-Design product, Armstrong Ultima Item No. 1911 or architect approved equivalent.
- B. Classification: Type IV, Form 2, Pattern E.
- C. Color: White.
- D. LR: 0.90.
- E. NRC: 0.75.
- F. CAC: 35.
- G. Edge/Joint Detail: Beveled Tegular.
- H. Thickness: 3/4 inch (19 mm).
- I. Modular Size: 24 by 24 inches (610 by 610 mm).

2.4 ACOUSTICAL PANELS – APC2

- A. Basis-of-Design product, Armstrong Kitchen Zone Item No. 673 or architect approved equivalent.
- B. Classification: Type IX, Form 2, Pattern G.
- C. Color: White.
- D. LR: 0.89.
- E. NRC: N/A.
- F. CAC: 33.
- G. Edge/Joint Detail: Square Lay-in.
- H. Thickness: 5/8 inch (19 mm).
- I. Modular Size: 24 by 24 inches (610 by 610 mm).

2.5 ACOUSTICAL PANELS – APC3 – NOT USED

2.6 ACOUSTICAL PANELS – APC4

- A. Basis-of-Design product, USG Sheetrock Brand Lay-In Gypsum Ceiling Panels or architect approved equivalent.
- B. Classification: Type XX, Pattern G.
- C. Color: White.
- D. LR: 0.77.
- E. NRC: n/a.
- F. CAC: 35.
- G. Edge/Joint Detail: Square.
- H. Thickness: 1/2 inch.
- I. Modular Size: 24 by 24 inches.

2.7 METAL SUSPENSION SYSTEM APC1 & APC2

- A. Basis-of-Design Product: Armstrong 15/16” Prelude suspension system or architect approved equivalent.

- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 15/16-inch wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel cold-rolled sheet.
 5. Cap Finish: Painted white.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Shadow Molding: Model # 7871 with $\frac{3}{4}$ inch flange and $\frac{3}{4}$ inch reveal.

2.8 METAL SUSPENSION SYSTEM APC4

- A. Basis-of-Design Product: USG CE or architect approved equivalent.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 15/16-inch wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: manufacturer's standard.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel cold-rolled sheet.
 5. Cap Finish: Painted white.
 6. Gaskets: White closed-cell foam
 7. Capable of withstanding cleaning and /or disinfecting chemicals as tested in accordance with ASTM D402.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Wall Angle to accommodate hold down clips.
 2. Hold down Clips

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. 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.
 - 1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.

END OF SECTION 09 5113

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SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

1.3 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. Resilient Base: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 linear feet.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE - RUB

A. Basis-of-Design product Roppe Pinnacle Rubber Wall Base or architect approved equivalent. Other manufacturers include but are not limited to:

1. Armstrong
2. Johnsonite

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

1. Style and Location:

- a. Style B, Cove

C. Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors: As scheduled.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. 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.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
 - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are the same temperature as the space where they are to be installed.

- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 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.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter or cope corners to minimize open joints.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 6513

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SECTION 09 6723 - RESINOUS FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the following:
 - 1. Resinous flooring system as shown on the drawings and in schedules.
- B. Related sections include the following:
 - 1. Cast-in-Place Concrete, section 03 30 00

1.3 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with Macro or Micro size decorative colored chip broadcast, epoxy resin broadcast and aliphatic resinous topcoat.
- B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- C. Cove base to be applied where noted on plans and per manufacturers standard details

1.4 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.
- D. Manufacturers' certification as an approved installer in writing.

1.5 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.
- B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified. The applicator / installer shall be a manufacturer's certified or approved installer in writing.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.

- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
- E. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping

1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 60 F and 85 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with cementitious urethane material.

1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 5 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
2. Concrete shall have a flat rubbed finish, float, or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
3. Sealers and curing agents should not be used.
4. Concrete shall have a minimum design strength of 3,500 psi. and a maximum water/cement ratio of 0.45
5. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. The Owner shall be responsible for the removal of foodstuffs from the work area.
2. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

- A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART 2 – PRODUCTS

2.1 FLOORING

- A. Dur-A-Flex, Inc, Hybri-Flex AC (self leveling broadcast colored chip), epoxy resin broadcast and aliphatic resinous topcoat seamless flooring system.
 1. System Materials:
 - a. Topping: Dur-A-Flex, Inc, Poly-Crete SL resin, SL hardener and SL aggregate.
 - b. The colored chips shall be Dur-A-Flex, Inc. Micro colored chips.
 - c. Broadcast coat: Dur-A-Glaze #4 resin and hardener.
 - d. Topcoat: Dur-A-Flex, Inc. Accelera resin and hardener.
 2. Patch Materials
 - a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
 - b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

2.2 MANUFACTURER

- A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802
- B. Manufacturer of Approved System shall be single source and made in the USA.

2.3 PRODUCT REQUIREMENTS

A. Topping	Poly-Crete SL
1. Percent Reactive	100%
2. VOC	0 g/L
3. Bond Strength to Concrete ASTM D 4541	400 psi, substrates fails
4. Compressive Strength, ASTM C 579	9,000 psi
5. Tensile Strength, ASTM D 638	2,175 psi
6. Flexural Strength, ASTM D 790	5,076 psi
7. Impact Resistance @ 125 mils, MIL D-3134, No visible damage or deterioration	160 inch lbs
B. Broadcast Coat	Dur-A-Glaze #4
1. Percent Solids	100 %

2.	VOC	3.8 g/L
3.	Compressive Strength, ASTM D 695	11,200 psi
4.	Tensile Strength, ASTM D 638	2,100 psi
5.	Flexural Strength, ASTM D 790	5,100 psi
6.	Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	29 mg loss
7.	Flame Spread/NFPA-101, ASTM E 84	Class A
8.	Impact Resistance MIL D-24613 delamination	0.0007 inches, no cracking or
9.	Water Absorption. MIL D-24613	Nil
10.	Potlife @ 70 F	20 minutes
C. Topcoat		Accelera
1.	Percent Solids	100 %
2.	VOC	0 g/L
3.	Bond Strength to Concrete ASTM D 4541	400 psi, substrates fails
4.	Hardness, Shore D ASTM D2240	70
5.	Compressive Strength, ASTM C579	18,000 psi
6.	Tensile Strength, ASTM D638	2,600 psi
7.	Abrasion Resistance, ASTM D4060 C-17 Wheel, 1,000 gm load, 1,000 cycles	27 mg loss
8.	Potlife @ 70 F	7 – 10 minutes
9.	Gloss (ASTM D523) 60°	90
10.	Coefficient of Friction (ASTM D2047)	0.8

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.

1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General

1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
 - a. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.

- b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 - c. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
3. Mechanical surface preparation
- a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes, and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
 - b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
 - c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
 - d. Cracks and joints (non-moving) greater than 1/8-inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufacturer's recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in Four distinct steps as listed below:
 - a. Substrate preparation
 - b. Topping/overlay application with colored chip broadcast.
 - c. Resin application with colored chip broadcast.
 - d. Topcoat application.
2. Immediately prior to the application of any component of the system, the surface shall be dry, and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.

2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using ½ inch “v” notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Colored chips shall be broadcast to excess into the wet material, Microchips at the rate of 0.15 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Broadcast Coat

1. The 2nd broadcast coat shall be applied as specified by the Architect.
2. The broadcast coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener.
3. The resin shall be added to the hardener and thoroughly mixed by suitably approved mechanical means.
6. The broadcast coat shall be applied over horizontal surfaces using squeegee and back rolled at the rate of 100 sf/gal.
5. Colored chips shall be broadcast to excess into the wet material, Microchips at the rate of 0.15 lbs./sf.
6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

E. Topcoat

1. The grout coat shall be comprised of ACCELERA resin and hardener mixed per the manufacturer’s instructions.
2. The grout coat shall be applied using a squeegee and cross rolled with a 3/8 inch nap roller at the rate of 65 sq ft / kit.
3. The finished floor will have a nominal thickness of 3/16 inch.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 1. Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 1. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer’s directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 09 6723

SECTION 09 6813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 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.
- C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II or Master II certification level.

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 100 sq. ft.

PART 2 - PRODUCTS

2.1 CARPET TILE – CPT 1

- A. Basis-of-Design product Mannington Creased paper.
- A. Color: As scheduled.
- B. Pattern: Crinkled Paper.
- C. Installation Method: Horizontal Brick Ashlar, as defined by manufacturer.
- D. Fiber Content: Type 6 Nylon.
- E. Fiber Type: Solution.
- F. Pile Characteristic: Textured Patterned Loop.
- G. Face Weight: 14 oz.
- H. Density: 6,222
- I. Backing: Infinity Modular.
- J. Size: 18 inches by 36 inches.
- K. Performance Characteristics:

1. Appearance Retention Rating: Severe traffic, 4 minimum according to ASTM D 7330.
2. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
3. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
4. Electrostatic Propensity: Less than 3.0 kV according to AATCC 134.

2.2 CARPET TILE – CPT 2

- A. Basis-of-Design product Mannington Crinkled Paper.
- B. Color: As scheduled.
- C. Pattern: Crinkled Paper.
- D. Installation Method: Horizontal Brick Ashlar, as defined by manufacturer.
- E. Fiber Content: Type 6 Nylon.
- F. Fiber Type: Solution.
- G. Pile Characteristic: Textured Patterned Loop.
- H. Density: 6,222
- I. Face Weight: 14 oz.
- J. Backing: Infinity Modular.
- K. Size: 18 inches by 36 inches.
- L. Performance Characteristics:
 1. Appearance Retention Rating: Severe traffic, 4 minimum according to ASTM D 7330.
 2. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
 3. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
 4. Electrostatic Propensity: Less than 3.0 kV according to AATCC 134.

2.3 CARPET TILE – WCPT

- A. Basis-of Design Product: Mannington Commercial
- B. Color: As Scheduled
- C. Pattern: Force
- D. Installation Method: Monolithic
- E. Fiber Content: Type 6,6 Nylon

- F. Fiber Type: Solution Dyed
- G. Pile Characteristic: Textured Patterned Loop
- H. Density: 7,005
- I. Backing: Infinity Modular Reinforced Composite Closed Cell Polymer with Recycled Content
- J. Size: 18 inch x 36 inch
- K. Performance Characteristics:
 - 1. Appearance Retention Rating: Severe traffic, 4 minimum according to ASTM D 7330.
 - 2. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
 - 3. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
 - 4. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Transition Strips:
 - 1. At CPT to Concrete: Schluter Reno-U EBU80 Brushed Stainless Steel.
 - 2. Installation: Fill backside of profile with thin set and set the anchoring leg in thinset before installing carpet flooring. Re: 093000 Tiling for Thinset Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m) and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate recommended by the flooring and adhesive manufacturer in writing.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum percent relative humidity level measurement recommended by the flooring and adhesive manufacturer in writing.

- c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- 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 (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: 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 adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile 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 carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 6813

SECTION 099100 - 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. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMU).
 - 3. Steel.
 - 4. Galvanized metal.
 - 5. Aluminum (not anodized or otherwise coated).
 - 6. Wood.
 - 7. Gypsum board.
- B. Related Requirements:
 - 1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this section.
 - 2. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
 - 3. Section 099600 "High-Performance Coatings" for tile-like coatings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Label each coat of each Sample.
 - 3. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Indicate VOC content.

1.4 CLOSEOUT SUBMITTALS

1. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint: 1 gallon of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:

1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.
 7. Application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated or comparable product from one of the following:
1. Benjamin Moore Corporation.
 2. PPG Architectural Finishes, Inc.
 3. Tnemec Company, Inc.
- B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:
1. Products are approved by manufacturer in writing for application specified.
 2. Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.
- C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall provide materials that comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 100 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Wood Coatings: 275 g/L.

C. Colors: As indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
 - 1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Gypsum Board: 12 percent.
 - e. Plaster: 12 percent.
 - 2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
 - 3. Plaster Substrates: Verify that plaster is fully cured.
 - 4. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "Data Pages" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 - 1. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply

additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Metal Substrates (Aluminum, Steel, Galvanized Steel):
 - 1. Waterbased Acrylic System:
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based Acrylic, interior, matching topcoat.
 - c. Topcoat: Water-based Acrylic, semi-gloss, interior:
 - 1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
 - 2. Waterbased/Alkyd Urethane System (Handrails):
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based acrylic-alkyd, exterior, matching topcoat.
 - c. Topcoat: Water-based alkyd-urethane, semi-gloss, exterior:
 - 1) S-W Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series, at 4.0 mils wet, 1.4 mils dry, per coat.
- B. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: Primer, latex, interior:
 - 1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.0 mils dry.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, **eggshell for office area**:
 - 1) S-W ProMar 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series, at 4.0 mils wet, 1.7 mils) dry, per coat.

- d. Topcoat: Latex, interior, **semi-gloss warehouse area:**
 - 1) S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
2. Water-Based Light Industrial Coating System (damp and wet areas including shower and restrooms, breakroom, loadout, and janitor closets):
 - a. Prime Coat: Primer sealer, latex, interior:
 - 1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 wet, 1.0 mils dry.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, **eggshell:**
 - 1) S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45-1151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

3.7 EXTERIOR PAINTING SCHEDULE

A. Ferrous Metal Fabrications:

1. Waterbased Light Industrial Acrylic System: over shop coat primer. Standard system for Hollow Metal Doors & Frames.
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based Acrylic, exterior, matching topcoat.
 - c. Topcoat: Water-based Acrylic, semi-gloss, exterior:
 - 1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
2. Waterbased/Alkyd Urethane System: over shop coat primer. Exposed Structural Steel and Pipe Bollards.
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based acrylic-alkyd, exterior, matching topcoat.
 - c. Topcoat: Water-based alkyd-urethane, semi-gloss, exterior:
 - 1) S-W Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series, at 4.0 mils wet, 1.4 mils dry, per coat.

B. Galvanized and Zinc Rich Metal Fabrications:

1. Waterbased Light Industrial Acrylic System: over shop coat primer. Standard system for Hollow Metal Doors & Frames.
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Water-based Acrylic, exterior, matching topcoat.
 - c. Topcoat: Water-based Acrylic, semi-gloss, exterior:
 - 1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

END OF SECTION 099123

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SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems.

1. Exterior Substrates:
 - a. Steel.
 - b. Galvanized metal.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
2. Section 055000 "Metal Fabrications" for shop priming and / or painting items with coatings specified in this Section.
3. Section 09 9100 "Painting" for special-use coatings and general field painting.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

1. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Label each coat of each Sample.
3. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.3 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 1 gallon of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.
 7. Application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated or comparable product from one of the following:
 - 1. Benjamin Moore Corporation.
 - 2. PPG Architectural Finishes, Inc.
 - 3. The Sherwin-Williams Company.
 - 4. Tnemec Company, Inc.
- B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:
 - 1. Products are approved by manufacturer in writing for application specified.
 - 2. Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.
- C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
 - 1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
 - 3. Provide products of same manufacturer for each coat in a coating system.
- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC content limits, exclusive

of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Floor Coatings: 100 g/L.
6. Shellacs, Clear: 730 g/L.
7. Shellacs, Pigmented: 550 g/L.

C. Colors: As indicated in color schedule.

2.3 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
1. Report in writing conditions that may affect application, appearance, or performance of paint.
- B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
 - 1. Contractor shall touch up and restore coated surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Steel Substrates:
 - 1. Pigmented Polyurethane System: For shop primer exterior systems.
 - a. Prime Coat: Alkyd anti-corrosive, quick dry:
 - 1) S-W Pro-Cryl Universal Primer, B66-310 Series, at 2.0 to 4.0 mils (0.051 to 0.102 mm) dry, per coat.
 - b. Intermediate Coat: Polyurethane, two-component, pigmented, matching topcoat.
 - c. Topcoat: Polyurethane, two-component, pigmented, gloss:
 - 1) S-W Hi-Solids Polyurethane 250, B65 Series, at 2.0 to 4.0 mils (0.051 to 0.102 mm) dry, per coat.
 - 2. Pigmented Polyurethane over Epoxy System:

- a. Prime Coat: Epoxy, high-build, low gloss:
 - 1) S-W Macropoxy 646-100, B58-600 Series, at 5.0 to 10 mils (0.127 to 0.254 mm) dry, per coat.
- a. Intermediate Coat: Polyurethane, two-component, pigmented, matching topcoat.
- b. Topcoat: Polyurethane, two-component, pigmented, gloss:
 - 1) S-W Hi-Solids Polyurethane 250, B65 Series, at 2.0 to 4.0 mils (0.051 to 0.102 mm) dry, per coat.

B. Galvanized-Metal Substrates:

1. Pigmented Polyurethane over Vinyl Wash Primer System:

- a. Prime Coat: Primer, vinyl wash:
 - 1) S-W DTM Wash Primer, B71Y1, at 0.7 to 1.3 mils (0.018 to 0.033 mm) dry, per coat.
- b. First Topcoat: Polyurethane, two-component, pigmented, matching topcoat.
- c. Second Topcoat: Polyurethane, two-component, pigmented, gloss:
 - 1) S-W Hi-Solids Polyurethane 250, B65 Series, at 2.0 to 4.0 mils (0.051 to 0.102 mm) dry, per coat.

END OF SECTION 099600

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SECTION 10 1100 - VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Visual display board assemblies - factory.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For visual display units.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
 - 2. Show locations of panel joints.
- C. Samples: For each type of visual display unit indicated.
- D. Product Schedule: For visual display units.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Submit manufacturer's limited five-year warranty against manufacturing defects.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 50 or less.

2.2 VISUAL DISPLAY BOARD ASSEMBLY – FACTORY FABRICATED

- A. Basis-of-Design: Claridge Series 5 Factory Built Units or architect approved equivalent. Equivalent manufacturers include, but are not limited to:
1. Egan Visual
 2. MDC Custom Dry Erase Combination Boards
 3. Best-Rite
- B. Visual Display Board Assembly: factory fabricated.
1. Assembly: Markerboard and tackboard.
 2. Corners: Square.
 3. Width: As indicated on Drawings.
 4. Height: As indicated on Drawings.
- C. Markerboard Panel: Porcelain-enamel-faced markerboard panel on core indicated.
1. Color: White.
 2. Magnetic.
- D. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; 5/8 inch wide perimeter trim with 1 inch joint strip.
1. Field-Applied Trim: Manufacturer's standard, snap-on trim with no visible screws or exposed joints.
 2. Aluminum Finish: Clear anodic finish.
- E. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
- F. Combination Assemblies: Provide manufacturer's standard exposed trim between abutting sections of visual display panels.
- G. Chalktray: Manufacturer's standard; continuous.
1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
- H. Accessories:
1. Dry Erase Kit, one per room.

2.3 MATERIALS

- A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
 - a. Claridge Products and Equipment, Inc.
 - b. PolyVision Corporation; a Steelcase company.

2. Gloss Finish: low gloss finish.
- B. Hardboard: ANSI A135.4, tempered.
- C. Particleboard: ANSI A208.1, Grade M-1.
- D. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.
- E. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

2.4 FABRICATION

- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
- B. Visual Display Boards: Assemble visual display boards unless otherwise indicated.
 1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.
- C. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.
 1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.5 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.
 1. Wall surface should meet or exceed a Level 5 finish per GA-214-M-97: Recommended Levels of Gypsum Board Finish. Provide at marker board surfacing directly adhered to the wall only. Not required for factory fabricated units.
 2. Test substrate with suitable moisture meter and verify that moisture content does not exceed four percent.
 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine walls and partitions for proper backing for visual display surfaces.

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

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.
- C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.

3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Install visual display surfaces according to manufacturer's written instructions.
- C. Field-Assembled Visual Display Units: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
 - 2. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.
- D. Factory-Fabricated Visual Display Board Assemblies: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches (400 mm) o.c. Secure tops and bottoms of boards to walls.

3.4 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 10 1100

SECTION 10 1419 – DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cutout dimensional characters.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.

- B. Thermal Movements: For exterior fabrications, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 DIMENSIONAL CHARACTERS

- A. Cutout Characters: Characters with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. APCO Graphics, Inc.
 - b. ASI Sign Systems, Inc.
 - c. Gemini Incorporated
 - d. Inpro Corporation
 - e. Metal Arts
 - f. Metallic Arts
 - g. The Southwell Company
 - h. Steel Art Company
2. Character Material: Sheet or plate aluminum.
3. Character Height: As indicated on Drawings.
4. Thickness: Manufacturer's standard for size of character.
5. Finishes: To match Owner's brand standards.
6. Mounting: Concealed studs.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
 1. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.
- C. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION 10 1419

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SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Panel Signs for Room Identification.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign to scale.
- C. Samples: For each exposed product and for each color and texture specified.
 - 1. Provide a mockup sample sign for final approval. If approved mockup sign can be used in project installation.
- D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SIGNS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Takeform Quad Fusion 1 or comparable product by one of the following:
 - 1. APCO Graphics, Inc.
 - 2. ASI Sign Systems, Inc.
 - 3. Best Sign Systems Inc.
- B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Basis-of-Design Product: Takeform Quad Fusion 1.
 - 2. Signage System
 - a. The signage shall incorporate a decorative laminate face with applied graphics including all tactile requirements in adherence to ADA specifications.
 - b. All signs, including work station and room ID's, overhangs and flag mounts, directionals and directories shall have a matching appearance and constructed utilizing the same manufacturing process to assure a consistent look throughout.
 - 3. Materials:
 - a. Sign face shall be 0.035" (nominal) standard grade, high pressure surface laminate. A painted sign face shall not be acceptable.
 - b. The sign shall incorporate balanced construction with the core sandwiched between laminates to prevent warping. Laminate on the sign face only shall not be acceptable.
 - c. Tactile lettering shall be precision machined, raised 1/32", matte PETG and subsurface colored for scratch resistance.
 - d. Signs shall incorporate a metal accent bar. Bars shall be anodized with a satin finish, color as scheduled. Painted bars shall not be acceptable. Refer to drawings.
 - 4. Standard Colors:
 - a. Face/background color shall be standard grade, high pressure laminate, color as scheduled.
 - b. Standard tactile colors shall match manufacturer's ADA standard color selection, color as scheduled.
 - 5. Construction:
 - a. The signage shall, with the exception of directories and directionals, be a uniform 8 1/2" width to facilitate inserts printed on standard width paper.
 - b. Insert components shall have a .080 thickness non-glare acrylic window and shall be inlaid flush to sign face for a smooth, seamless appearance.

- c. The signage shall include modules allowing for inserts, notice holders, occupancy sliders, marker, magnetic, and cork boards. All modules shall be flush to sign face for a smooth, seamless appearance.
 - d. The laminates (front and back) shall be pressure laminated and precision machined together to a 90-degree angle. Edges shall be smooth, void of chips, burrs, sharp edges and marks.
 - e. The signage shall utilize an acrylic sphere for Grade II Braille inserted directly into a scratch resistant, high pressure laminate sign face. Braille dots are to be pressure fit in high tolerance drilled holes.
 - f. Braille dots shall be half hemispherical domed and protruding a minimum 0.025”.
 - g. The signage shall utilize a pressure activated adhesive. The adhesive shall be nonhazardous and shall allow for flexing and deflection of the adhered components due to changes in temperature and moisture without bond failure.
 - h. All signs shall be provided with appropriate mounting hardware. Hardware shall be finished and architectural in appearance and suitable for the mounting surface.
 - i. Some signs may be installed on glass. A blank backer is required to be placed on the opposite side of the glass to cover tape and adhesive. The backer shall match the sign in size and shape.
6. Typeface / Font: ADA compliant, to be selected.
7. Printed Inserts:
- a. The signage shall be capable of accepting paper or acetate inserts to allow changing and updating as required. Insert components shall have a 0.080” thickness non-glare acrylic window and shall be inlaid flush to sign face for a smooth, seamless appearance.
 - b. The signage contractor shall provide and install all signage inserts.
 - c. Manufacturer shall provide a template containing layout, font, color, artwork and trim lines to allow Owner to produce inserts on laser or ink jet printer. The template shall be in an Acrobat or Word format (.pdf).
8. Mounting: Manufacturer's standard method for substrates indicated.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 1.14 mm (0.045 inch) thick, with adhesive on both sides.

2.4 FABRICATION

- A. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
 - 1.
 - 2. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

- C. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.
- D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Mounting Methods:
 - 1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
 - 2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- C. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION 10 1423

SECTION 10 2113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid-plastic toilet compartments configured as toilet enclosures, urinal screens and shower partitions.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.
- C. Samples for each type of toilet compartment material indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Basis-of-Design Product: Subject to compliance with requirements, Scranton Products, Hiny Hiders or architect approved equivalent
- B. Toilet-Enclosure Style: Overhead braced.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, Screen, and Pilaster Construction: Solid Color Reinforced Composite (SCRC) panel material, manufacturer's standard thickness, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material. Class B Fire Rating Material.
 - 1. Gap free interlocking privacy option
 - 2. Standard Concealed Stainless-Steel Hardware
 - 3. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 - 4. Color and Pattern: As scheduled on drawings.
- E. Pilaster Shoes and Sleeves (Caps): stainless steel.
- F. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: stainless steel.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
 - 1. Material: Stainless steel
 - a. 18-8, type-304 Stainless Steel. Hardware of chrome-plated zamac, aluminum or plastic is unacceptable.
 - 2. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
- B. Hardware and Accessories: Manufacturer's heavy-duty stainless-steel operating hardware and accessories.
 - 1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
- C. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- D. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch (13 mm).
 - b. Panels and Walls: 1 inch (25 mm).
 - 2. Full-Height (Continuous) Brackets: Secure panels to pilasters with full-height brackets.
 - a. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.19

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SECTION 10 2600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corner guards:
 - a. Plastic
 - b. Stainless Steel
2. Wall guards:
 - a. Stainless steel wall protection

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
1. Include plans, elevations, sections, and attachment details.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

1.6 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. Corner Guards: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 2 units.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

2.2 CORNER GUARDS

- A. Surface-Mounted, Plastic-Cover Corner Guards - CG: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
 - 1. Location: Lobby and Office Areas
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties, Inc.; SSM-20N or comparable product by one of the following:
 - a. IPC Door and Wall Protection Systems; Division of InPro Corporation
 - b. Korogard Wall Protection Systems; a Division of RJF International Corporation.
 - 3. Cover: Extruded rigid plastic, minimum 0.078-inch (2.0-mm) wall thickness as follows:
 - a. Profile: Nominal 2-inch (50mm) long leg and ¼ inch (6mm) corner radius.
 - b. Height: 6'-10" total height installed above the base. The top of the corner guard shall be at 7'-2" to align with the top of the 2-inch-high door frames, unless noted otherwise.
 - c. Color and Texture: As scheduled.
 - 4. Continuous Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum.
 - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
- B. Surface- Mounted Stainless Steel Corner Guards – SST CG:
 - 1. Location: Warehouse

2. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties, Inc. Stainless Steel Corner Guards C0-8 or comparable products by one of the following:
 - a. ProTek Systems, Inc.
 - b. IPC Door and Wall Protection Systems; Division of InPro Corporation
 - c. Korogard Wall Protection Systems; a Division of RJF International Corporation.
3. 304 Stainless Steel alloy with a #4 satin finish.
4. 3 ½ inch legs.
5. Height: 5'-0" total height installed above the base.

2.3 WALL GUARDS

- A. High Impact Wall Covering, Stainless Steel Wall Protection at cooking wall in kitchen.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide ProTek Stainless Steel Wall Panels WPS-12 or architect approved equivalent.
 2. Provide stainless steel edge bar for transition to other wall surfaces. 1 inch by 1/8 inch.
 3. Mounting: ADH-50 Construction Adhesive.
 4. Gauge: Gauge as recommended by manufacturer for application.

2.4 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required; thickness as indicated.
- B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. (800 J/m) of notch when tested according to ASTM D 256, Test Method A.
- C. Stainless Steel: Type 304 #4 Satin stainless steel sheet.
- D. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- E. Adhesive: As recommended by protection product manufacturer.
 1. Adhesives shall have a VOC content of 70 g/L or less.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm) apart.
 - 3. Adjust end and top caps as required to ensure tight seams.

END OF SECTION 10 2600

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full size, for each exposed product and for each finish specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Waste Receptacle – WR1:

1. Basis-of-Design Bobrick B-2300 Floor-Standing Dome-Top Waste Receptacle or equal.
Other equivalent manufacturers include but are not limited to:

- a. Bradley Corporation
 - b. American Specialties
2. Mounting: Freestanding.
 3. Minimum Capacity: 18 gal. (49.2 L).
 4. Material and Finish: Stainless steel, No. 4 finish (satin) and black cold-rolled steel dome top with 6 inch diameter opening.
 5. Liner: Reusable vinyl liner.
- B. Waste Receptacle WR2:
1. Basis-of-Design Bradley Model 377-13
 2. Mounting: Freestanding
 3. Minimum Capacity: 13 gal
 4. Material and Finish: Stainless Steel
- C. Waste Receptacle WR3:
1. Basis-of-Design Rubbermaid Commercial Slim Jim Container, SKU#1971258. Provide 10 for kitchen and cleanroom areas.
 2. Mounting: Freestanding.
 3. Minimum Capacity: 16 gal
 4. Material and Finish: Gray Injection molded with high quality resin blend.
 5. Lids: Confirm lid types and final quantity with owner. Provide pricing for 10 with contract documents.
- D. Trash Grommet:
1. Basis-of-Design Bradley Model P-10-696 Circular Waste Chute, or architect approved equivalent. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties
- E. Toilet Paper Dispenser, TPD:
1. Basis-of-Design Bradley Model 5105, recessed toilet tissue dispenser plus spare roll or architect approved equivalent. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties
- F. Liquid-Soap Dispenser, countertop mounted – SD1:
1. Basis-of-Design Bradley Model 6326-68 Lavatory-Mounted Soap Dispenser fillable from top or by removing container. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties
- G. Liquid-Soap Dispenser, wall mounted – SD2:

1. Basis-of-Design Georgia Pacific Enmotion 52060 Surface-Mounted Soap Dispenser. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. Bradley Corporation
 - c. American Specialties
- H. Paper Towel Dispenser, Wall mounted – PTD:
1. Basis-of-Design: Georgia Pacific Enmotion 59766. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. Bradley Corporation
 - c. American Specialties
- I. Mirror – MIRROR:
1. Basis-of-Design: Bradley Angle Frame Mirror Model 780-1836 or equal. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties
 2. Size: 18 inches by 36 inches
- J. Grab Bar GBA, GBB, GBC, GBD, GBE:
1. Basis-of-Design: Bradley Model 832 or equal. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
 - a. Finish: Smooth, No. 4 finish (satin).
 4. Outside Diameter: 1-1/4 inches (32 mm).
 5. Configuration and Length:
 - a. GBA: Horizontal, 36 inch length.
 - b. GBB: Horizontal, 42 inch length.
 - c. GBC: Vertical, 18 inch length.
 - d. GBD: Horizontal, 48 inch length.
 - e. GBE: Horizontal, 12 inch length.
- K. Sanitary-Napkin Disposal Unit SND:
1. Basis-of-Design: Bradley Model 4731-15 or equal. Other equivalent manufacturers include but are not limited to:
 - a. Bradley Corporation
 - b. American Specialties

2. Mounting: Recessed.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

L. Robe Hook – RH1

1. Basis-of-Design Bradley Model 912 Double Robe Hook in Chrome Plated Brass. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties

M. Robe Hook – RH2

1. Basis-of-Design Bradley Model 9124 Double Robe Hook in Satin Stainless-Steel Finish. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties

N. Shower Curtain, Hook and Rods - SC:

1. Curtain: Basis-of-Design Construction Specialties Group Shower Curtain with traditional grommets for shower curtain hooks or equal.
 - a. Fabric: Shower Shield non vinyl water repellent fabric.
 - b. Color: to be selected from manufacturers standard colors.
 - c. Size: to fit a 36” wide by 74” high opening, field verify.
2. Hook: Basis-of-Design Bradley Model 9540 Stainless Steel Shower Curtain Hook.
3. Rod: Basis-of-Design Bradley Model 9539 Shower Curtain Rod with Concealed Mounting. Field verify size.

O. Shower Seat – SS:

1. Basis-of-Design ADA Shower seat, Bradley Bradmar Model 9592 high density polyethylene shower seat with satin finish stainless steel frame and mounting flange. Other equivalent manufacturers include but are not limited to:
 - a. Bobrick
 - b. American Specialties

2.3 UNDERLAVATORY GUARDS

A. Underlavatory Guard:

1. Manufacturers include but are not limited to:
 - a. IPS Corporation
 - b. Plumberex Specialty Products Inc.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.4 CUSTODIAL ACCESSORIES

- A. Mop and Broom Holder MS:
1. Basis-of-Design Bradley Model 9954
 2. Description: Unit shelf with Mop/Broom Holders and Rag Hooks.
 3. Length: 36 inches.
 4. Hooks: Four.
 5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - a. Shelf: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.

2.5 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

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: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

END OF SECTION 10 2800

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SECTION 10 4410 - FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY:

- A. Section Includes:
 - 1. Fire extinguishers and cabinets as shown on the drawings.

1.2 SUBMITTALS:

- A. Product Data:
 - 1. Submit manufacturer's technical data and installation instructions for each type of fire extinguisher and cabinet required. Include dimensions and clearances required.

1.3 QUALITY ASSURANCE:

- A. Standards:
 - 1. Provide fire extinguishers conforming to NFPA Standard No. 10 and bearing UL label.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHER AND CABINET MANUFACTURERS:

- A. J. L. Industries
- B. Larsen's Manufacturing Co.
- C. Potter Roemer LLC.

2.2 FIRE EXTINGUISHERS:

- A. Provide one fire extinguisher and cabinet in office area at location indicated on drawings. Provide one fire extinguisher with wall mounting bracket in garage at location indicated on drawings.
- B. Provide fire extinguishers for each extinguisher cabinet and other locations as shown on the drawings. Furnish only new fire extinguishers which are approved and labeled by Underwriter's Laboratories.
- C. Provide colors and finishes of materials for portable fire extinguishers as selected by the Architect from manufacturer's standard.
- D. Fill and service extinguishers in accordance with governing authorities.
- E. Provide required type mounting brackets for wall-mounted extinguishers and those located in cabinets requiring brackets.
- F. Multi-Purpose Dry Chemical: 10 pound capacity, enameled steel container with pressure-indicating gauge, for Class 4A:80B:C.

2.3 FIRE EXTINGUISHER CABINETS:

- A. Provide fire extinguisher cabinets suitable for housing one standard 10 pound size fire extinguisher as follows:
 - 1. Provide clear anodized aluminum cabinet with vertical glass overlap panel doors.

- Provide Safety locking door or break-glass entry.
- 2. Corner Construction: Welded, Seamless Corners.
- 3. Mounting:
 - a. In 6” deep or greater wall: Fully Recessed.
 - b. In less than 6” deep wall: Semi-Recessed.

PART 3 EXECUTION

3.1 INSTALLATION:

- A. Install in locations and at mounting height to comply with governing authorities. If authorities have no requirements, mount at 2'-6" to bottom of cabinet, unless otherwise indicated on drawings. Coordinate recesses with carpentry, masonry or framing trades as appropriate. Prepare recesses in walls as required. Securely fasten items to structure, square and plumb, in accordance with manufacturer's instructions. Maintain fire rating of wall, if any.
- B. Wherever exact location of units is not shown, locate as directed by Architect.
- C. Fill and charge extinguishers just prior to substantial completion.

3.2 PROTECTION AND CLEANING:

- A. Clean fire extinguisher cabinets and repair minor damage to finishes. Replace units damaged beyond satisfactory repair as determined by Architect.
- B. Advise Contractor of protection measures necessary to protect fire extinguishers and cabinets during subsequent construction.

END OF SECTION 10 4410

SECTION 10 5126 - PLASTIC LOCKERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic lockers.

1.2 RELATED SECTIONS

- A. Division 06 Section "Rough Carpentry" for locker anchorage.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
 - 2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. US Federal Government:
 - 1. U.S. Architectural & Transportation Barriers Compliance Board. Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG). GREENGUARD Environment Institute is an ANSI Authorized Standards Developer that oversees the GREENGUARD certification program. GEI establishes acceptable indoor air standards for indoor products, environments, and buildings.

1.4 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets for each type of product indicated include fabrication details, description of materials and finishes.
 - 1. Product Test Reports: When requested by Architect, provide documentation indicating compliance of products with requirements, from a qualified independent testing agency.
- B. Shop Drawings: Include overall locker dimensions, floor plan, elevations, sections, details, and attachments to other work. Include choice of options with details.
- C. Samples for Selection: Furnish samples of manufacturer's full range of colors for initial selection.
- D. Samples for Approval: Furnish a physical sample of the material in the selected color.
 - 1. Size: 6 by 6 inch (102 by 102 mm) in type of finish specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Installation instructions.
- B. Warranty: Sample of special warranty.

1.6 MAINTENANCE SUBMITTALS

- A. Operation and Maintenance Data.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum [5] years experience in the manufacture of plastic lockers. Manufacturers seeking approval must submit the following in accordance with Instructions to Bidders and Division 01 requirements:
 - 1. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
 - 2. Samples of each component of product specified.
 - 3. List of successful installations of similar products available for evaluation by Architect.
 - 4. Submit substitution request not less than 15 days prior to bid date.
- B. Installers Qualifications: An experienced Installer regularly engaged in the installation of lockers for a minimum of 3 years.
- C. Source Limitations: Obtain plastic lockers and trim accessories from single manufacturer.
- D. Accessibility Requirements: Comply with requirements of ADA/ABA and with requirements of authorities having jurisdiction.
- E. 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. Flame-Spread Index: 100 or less.
 - 2. Smoke-Developed Index: 450 or less.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver plastic lockers to the site until the building is enclosed and HVAC systems are in operation. Deliver plastic lockers in manufacturer's original packaging. Store in an upright condition. Protect plastic lockers from exposure to direct sunlight.

- B. Ship plastic lockers fully assembled.
- C. Lift and handle plastic lockers from the base not the sides.

1.9 WARRANTY

- A. Special Manufacturer's Warranty: 20 years against rust, delamination or breakage of plastic parts under normal use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of Bradley Corporation, Menomonee Falls, WI 53051, (800)272-3539, fax (262)251-5817; Email info@BradleyCorp.com; Website www.bradleycorp.com or architect approved equal.

B. MATERIALS

- 1. High Density Polyethylene (HDPE): 30 percent pre-consumer recycled content polyethylene thermoplastic formed under high pressure into solid plastic components.
- 3. Stainless-Steel Sheet: ASTM A 666, Type 304.
- 4. Fasteners: Tamper-Resistant Fasteners: Stainless steel torx-head screws.
 - a. Locker Connectors: No. 10-24 sex bolts.
 - b. Anchors: Type and size required for secure anchorage.

2.2 MULTI-HEIGHT LOCKERS

- A. Basis-of-Design Product: Bradley Lenox Locker.
- B. Locker Configurations: 36 ½" tall one tier locker with a 36 ½" tall three tier locker installed on top for a total of 73" high lockers as shown on drawings.
- C. Locker Dimensions
 - 1. Height, Nominal:
 - a. Single Tier: 36 ½ inch
 - b. Triple Tier: 36 ½ inch.
 - 2. Width: 12 inches.

3. Depth: 18 inches.
- D. Material: HDPE plastic, 30 percent recycled material.
- E. Sides, Tops, Bottoms, Dividers, and Shelves: 3/8 inch (10 mm) thick HDPE plastic with smooth finish.
- F. Locker Shelves: 3/8-inch (10 mm) HDPE plastic, mortised into sides and back.
- G. Locker Tops: Flat top.
- H. Doors: Fabricate from a single piece 1/2-inch (13 mm) HDPE plastic.
 1. Doors and Frame: 1/2 inch (13 mm) thick HDPE plastic with matte texture finish with ventilation slots.
 3. Handle: ADA/ABA-compliant handle fabricated from injection molded plastic.
 4. Locks: Standard hasp.
 5. Hinges: Continuous piano hinges, .05 inch/18-gauge (1.27mm) type 304 stainless steel fabricated to wrap around edges of door and frame and attached with stainless steel tamper-resistant screws.
 - a. Finish: Powder coated to match color of locker.
 6. Latch Bar: Full-height latch bar constructed of 1/2-inch (13 mm) HDPE plastic secured to locker with stainless steel tamper-resistant screws.
- I. Color: As selected by Architect from manufacturer's full range.
- J. Accessories:
 1. Wall Hooks: Black polycarbonate double hook, one per single tier locker located on the back wall. None located in the three tier lockers.
 2. Filler Panels: 1/2-inch (13 mm) HDPE filler panel, with color and finish matching locker body, attached with 3/8 inch (10 mm) thick HDPE solid plastic angle bracket.
 3. Number Plate: White acrylic with black film coating, laser etched with number specified. Provide one per locker.
 4. Locker Base: 1 inch (26 mm) solid HDPE plastic, with color and finish matching locker body, 4 inches (101 mm high).

PART 3 - EXECUTION

3.1 INSTALLATION

PLASTIC LOCKERS

- A. Install lockers in climate-controlled environment, shielded from direct sunlight.
- B. General: Install on floor or other firm support. Install level, plumb, and true.
 - 1. Position locker base per approved shop drawing. Using fasteners provided by manufacturer, anchor base sections to the floor.
 - 2. Attach filler pieces to lockers with male-female sex bolts.
 - 3. Position first locker according to submittal layout. Square and plumb the locker using concealed shims. Secure the locker to the wall at the top and bottom of the locker. Position second locker next to first, square and plumb to align the tops and bottoms; and temporarily clamp lockers together. Drill four holes through the sides of the lockers and connect lockers using sex bolts provided by manufacturer.
- C. Accessories: Fit exposed connections of trim, fillers, and closures together to form tight, hairline joints, with concealed fasteners and splice plates furnished by locker manufacturer. Install as indicated on approved shop drawings.
 - 1. Coat Hooks: Attach with at least two fasteners.
 - 2. Identification Plates: Identify plastic lockers with approved identification numbers. Attach plates to each locker door.
 - 3. Filler Panels: Attach with concealed fasteners.

3.2 FINAL CLEANING

- A. Clean locker interior and exterior surfaces.
- B. Remove packaging and construction debris and legally dispose of off-site.

END OF SECTION 10 5126

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SECTION 111313 - LOADING DOCK BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes loading dock bumpers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of loading dock bumper.
- B. Shop Drawings: For dock bumpers. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 LOADING DOCK BUMPERS

- A. General: Surface-mounted bumpers; of type, size, and construction indicated; designed to absorb kinetic energy and minimize damage to loading dock structure.
 - 1. Manufacturer: Acceptable manufacturers include, but are not limited to, the following. All dock equipment specified in sections 111313 Loading Dock Bumpers, 111316 Loading Dock Shelters, and 111319 Stationary Loading Dock Equipment shall be provided by a single manufacturer or manufacturer shall provide written certification that products provided are compatible and designed to be integrated together. Only manufacturers with factory-authorized service providers within 100 miles of the project site will be considered
 - a. Kelley
 - b. Poweramp
 - c. WB McGuire
- B. Laminated-Tread Loading Dock Bumper: Fabricated from multiple, uniformly thick plies cut from fabric-reinforced rubber tires.
 - 1. Thickness: 4-1/2 inches (114 mm).
 - 2. Vertical Style: 14 inches wide by 20 inches (508 mm) high.
- C. Materials: ASTM A36/A36M for steel plates, shapes, and bars. Hot-dip galvanize according to ASTM A123/A123M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Attach loading dock bumpers to face of loading dock in a manner that complies with requirements indicated for spacing, arrangement, and position relative to top of platform and anchorage.
 - 1. Welded Attachment: Plug-weld anchor holes in contact with steel inserts and fillet weld at other locations.
 - 2. Bolted Attachment: Attach dock bumpers to preset anchor bolts embedded in concrete or to cast-in-place inserts or threaded studs welded to embedded-steel plates or angles. If preset anchor bolts, cast-in-place inserts, or threaded studs welded to embedded-steel plates or angles are not provided, attach dock bumpers by drilling and anchoring with expansion anchors and bolts.

- B. After completing installation of exposed, factory-finished dock bumpers, inspect exposed finishes and repair damaged finishes.

END OF SECTION 111313

SECTION 111316 - LOADING DOCK SHELTERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Frame-type loading dock shelters.

1.2 ACTION SUBMITTALS

- A. Bundled Submittal: Make submittal related to Sections listed below in a single package. Include product data, shop drawings, and schedule data.
 - 1. Section 11 1313 Loading Dock Bumpers
 - 2. Section 11 1316 Loading Dock Shelters
 - 3. Section 11 1319 Stationary Loading Dock Equipment
- B. Product Data: For each type of product.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
- D. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Acceptable Manufacturers and Products
 - 1. Compatibility: Acceptable manufacturers include, but are not limited to, the following. All dock equipment specified in sections 111313 Loading Dock Bumpers, 111316 Loading Dock Shelters, and 111319 Stationary Loading Dock Equipment shall be provided by a single manufacturer or manufacturer shall provide written certification that products provided are compatible and designed to be integrated together. Only manufacturers with factory-authorized service providers within 100 miles of the project site will be considered.
 - 2. Location and serviceability: Only manufacturers with factory-authorized service providers within 100 miles of the project site will be considered.

2.2 FRAME-TYPE LOADING DOCK SHELTERS

- A. General: Dock shelters designed to form a seal with sides and top of truck body while leaving entire width and height of truck's rear opening unobstructed.
- B. Flexible-Frame Type: Fabricated from fabric-covered side and top panels attached to retractable supporting framework with independent spring-tension extension arms. Provide head and side curtains with built-in flexible stays, pleated protectors, reinforcing, and guide strips. Provide replaceable, fabric-covered, tapered, foam-bottom pads of size and type required for application shown.
- C. Head-Pad Height: 30 inches to 36 inches per manufacturer's standard for a 10' tall door opening.
- D. Construction: Fabricate to sizes and shapes indicated or required to fit door-opening sizes shown, and allow for not less than 18 inches (457 mm) of truck-body penetration when truck is docked.
 - 1. Steel Framework: Zinc-plated steel tubing of size and thickness standard with manufacturer, with joints welded.
 - a. Steel Finish: Hot-dip galvanize components to comply with the following:
 - 1) ASTM A123/A123M for iron and steel support framing.
 - 2) ASTM A153/A153M or ASTM F2329 for iron and steel hardware and anchors.
 - 2. Top and Side Panels: White, translucent vinyl, weighing 14 oz./sq. ft. (4272 g/sq. m).
 - 3. Tapered Side Panels: Taper side panels to angle required to accommodate sloped loading dock approach grades, and make sealing edge of dock shelter parallel to back edge of truck. Taper for declined approach.
 - 4. Guide Strips: 4-inch- (102-mm-) wide, coated, nylon guide strips on side curtains.
 - 5. Pleated Protectors: On head curtain of overlapping layers of coated fabric attached to base fabric.
 - 6. Reinforcing: Manufacturer's standard reinforcing over cover fabric on side curtains and top cover of dock shelter.
- E. Fabric:
 - 1. Cover Fabric: Manufacturer's proprietary cover fabric.
 - a. Tear Strength: minimum 190 pounds-warp x 160 pounds-fill, tested according to Federal Standard 191A, Method 5100.
 - b. Abrasion Resistance: 5000 cycles minimum, tested according to Federal Standard 191A, Method 5100.
 - c. Tensile Strength: minimum 800 pounds-warp x 750 pounds-fill, tested according to Federal Standard 191A, Method 5100.
 - d. Color: As selected by Architect from manufacturer's full range.
 - 2. Pleated Protectors: Same fabric as cover.

- F. Accessories:
 - 1. Buffer flaps.
 - 2. Bottom seal pads.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Coordinate electrical connections with Division 26 Sections.

3.2 INSTALLATION OF FRAME-TYPE LOADING DOCK SHELTERS

- A. Attach dock shelters securely to building structure in proper relation to openings, dock bumpers, and dock levelers to ensure an effective seal of dock-shelter curtains with sides and top of truck body when trucks are positioned against dock bumpers.

3.3 ADJUSTING

- A. After completing installation, inspect exposed factory finishes and repair damaged finishes.

END OF SECTION 111316

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SECTION 111319 - STATIONARY LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Recessed loading dock levelers.
 - 2. Truck restraints.
 - 3. Control Stations.
 - 4. Light Communication System.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Bundled Submittal: Make submittal related to Sections listed below in a single package. Include product data, shop drawings, and schedule data.
 - 1. Section 11 1313 Loading Dock Bumpers
 - 2. Section 11 1316 Loading Dock Shelters
 - 3. Section 11 1319 Stationary Loading Dock Equipment
- B. Product Data: For each type of product.
- C. Shop Drawings: For stationary loading dock equipment.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of anchors and each field connection.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product test reports.
- C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

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

1.7 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace dock levelers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Structural Assembly: 10 years from date of Substantial Completion.
 - 2. Warranty Period for Lifting System: Four years from date of Substantial Completion.
 - 3. Warranty shall be for unlimited usage of leveler for the specified rated capacity over the term of the warranty.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Acceptable Manufacturers and Products
 - 1. Compatibility: Acceptable manufacturers include, but are not limited to, the following. All dock equipment specified in sections 111313 Loading Dock Bumpers, 111316 Loading Dock Shelters, and 111319 Stationary Loading Dock Equipment shall be provided by a single manufacturer or manufacturer shall provide written certification that products provided are compatible and designed to be integrated together. Only manufacturers with factory-authorized service providers within 100 miles of the project site will be considered.
 - 2. Location and serviceability: Only manufacturers with factory-authorized service providers within 100 miles of the project site will be considered.

2.2 RECESSED LOADING DOCK LEVELERS

- A. General: Recessed, hinged-lip-type dock levelers for permanent installation in concrete pits preformed in the edge of loading platform.
 - 1. Manufacturer: Subject to project requirements, provide products from one of the following or approved equal manufacturer
 - a. Kelley
 - b. Poweramp
 - c. WB McGuire

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Standard: Comply with MH 30.1.
- D. Rated Capacity: Capable of supporting total gross load of 40,000 lb without permanent deflection or distortion.
- E. Platform: Not less than 1/4 inch thick, nonskid steel plate.
 - 1. Platform Width: 84 inches (2134 mm).
 - 2. Platform Length: 96 inches (2438 mm) .
 - 3. Frame: Clean-pit type, designed to support leveler at sides of pit, with no supports at front of pit floor.
 - 4. Toe Guards: Equip open sides of dock leveler over range indicated with steel toe guards.
 - a. Toe-Guard Range: Entire upper operating range.
- F. Hinged Lip: Not less than 5/8- (16-) inch- (mm-) thick, nonskid steel plate.
 - 1. Hinge: Full-width, piano-type hinge with heavy-wall hinge tube, with gussets on lip and ramp for support.
 - 2. Safety Barrier Lip: Designed to protect material-handling equipment from an accidental fall from loading platform edge of the dock leveler when the leveler is not in use.
- G. Function: Dock levelers shall compensate for differences in height between truck bed and loading platform.
 - 1. Vertical Travel: Operating range above platform level of sufficient height to enable lip to extend and clear truck bed before contact with the following minimum working range:
 - a. Above Adjoining Platform: 12 inches (305 mm).
 - b. Below Adjoining Platform: 12 inches (305 mm).
 - 2. Automatic Vertical Compensation: Floating travel of ramp with lip extended and resting on truck bed shall compensate automatically for upward or downward movement of truck bed during loading and unloading.
 - 3. Lip Operation: Manufacturer's standard mechanism, which automatically extends and supports hinged lip on ramp edge with lip resting on truck bed over dock leveler's working range, allows lip to yield under impact of incoming truck and automatically retracts lip when truck departs.
 - a. Length of Lip Extension: Not less than 20 inches (508 mm) measured from ramp edge.
 - 4. Interlock: Leveler does not operate while overhead door is in closed position or truck restraint is not engaged.
- H. Mechanical Operating System: Manual control; counterbalance and spring operation. Spring-operated raising and walk-down lowering of unloaded ramp. Equip leveler with an upward-biased-spring counterbalancing mechanism controlled by a hold-down device. Ramp raises to top limit of operating range by operating recessed control handle in ramp to disengage hold-

down device. Ramp lowers below platform level with lip retracted by operating auxiliary, recessed control handle to release support legs.

1. Locations: Doors 152D, 153E, 152F, and 152G.
 2. Free-Fall Protection: Manufacturer's standard protection system to limit free fall of loaded ramps with front edge supported by truck bed.
- I. Air-Bag Operating System: Electric control from a remote-control station; pneumatic operation. High-volume, low-pressure lifting of ramp. Equip leveler with a packaged unit including a PVC-coated, reinforced polyester lifting bag and two-stage, single-speed electric fan of proper size, type, and operation for capacity of leveler indicated. Include dock-leveler supports controlled by release chain for lowering ramp below platform level without extending lip.
1. Locations: Doors 152B and 152C.
 2. Control Station: Multibutton control station with an UP button of the constant-pressure type and an emergency STOP button of the momentary-contact type, enclosed in NEMA ICS 6, Type 12 box. Ramp raises by depressing and holding UP button; ramp lowers at a controlled rate by releasing UP button. Ramp movement stops, regardless of position of ramp or lip, by depressing STOP button. Normal operation resumes by engaging a manual reset button or by pulling out STOP button.
 - a. Master Panel: Control panel with integral fused disconnecting means for operating dock leveler, dock door, light communication system and truck restraints.
 - 1) Unit shall be capable of being programmed to control all associated dock equipment, and interlocked all equipment in sequence.
- J. Construction: Fabricate dock-leveler frame, platform supports, and lip supports from structural- or formed-steel shapes. Weld platform and hinged lip to supports. Fabricate entire assembly to withstand deformation during both operating and stored phases of service. Chamfer lip edge to minimize obstructing wheels of material-handling vehicles.
1. Cross-Traffic Support: Manufacturer's standard method of supporting ramp at platform level in stored position with lip retracted. Provide a means to release supports to allow ramp to descend below platform level.
 2. Maintenance Strut: Integral strut to positively support ramp in up position during maintenance of dock leveler.
- K. Materials:
1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 2. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from steel plate complying with ASTM A572/A572M, Grade 55 (380).
 3. Steel Tubing: ASTM A500/A500M, cold formed.
 4. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- L. Dock-Leveler Finish: Manufacturer's standard rust-inhibitive, baked-on factory finish.
1. Toe Guards: Baked-on factory finish.

M. Accessories:

1. Curb Angles: 3-by-3-by-1/4-inch (76-by-76-by-6-mm) galvanized-steel curb angles for edge of recessed leveler pit, with 1/2-inch- (13-mm-) diameter by 6-inch- (152-mm-) long concrete anchors welded to angle at 6 inches (152 mm) o.c.
2. Self-Forming Pan: Manufacturer's standard prefabricated, self-forming steel form system for poured-in-place construction of concrete pit.
3. Night Locks: Manufacturer's standard means to prevent extending lip and lowering ramp when overhead doors are locked.
4. Side and rear weatherseals.
5. Foam insulation under dock-leveler platform.

2.3 TRUCK RESTRAINTS

- A. General: Manufacturer's standard device designed to engage truck's rear-impact guard and hold truck at loading dock.
1. Basis of Design Product: Kelley Star 4 Vehicle Restraint.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Standard: Comply with MH 30.3.
- D. Rated Capacity: Capable of supporting total gross load of 30,000 lb without permanent deflection or distortion.
- E. Operating Range: Capable of restraining rear-impact guards within a range from:
1. Vertical Range: Minimum of 11 inches (279 mm) to maximum of 28 inches (711 mm) above driveway.
 2. Horizontal Range: Zero to 10 inches (254 mm) in front of dock bumpers.
- F. Power Operating System: Manufacturer's standard electromechanical or hydraulic unit.
1. Integrated with master Control Station listed under Air-Bag Operating System dock leveler in Part 2.2.
 2. Interlock: Leveler does not operate while truck restraint is not engaged.
- G. Rear-Impact-Guard Sensor: Detects presence of rear-impact guard.
- H. Caution Signs: Exterior, surface mounted; designed to inform both dock attendant and truck driver; with sign copy as follows. Provide one sign at each truck-restraint location.
1. Sign Copy in Forward and Reverse Text: Manufacturer's standard text permitting truck movement with green light.
 2. Interior Sign Copy: Manufacturer's standard text permitting truck movement with green light.
- I. Light Communication System: Red and green illuminated signal-light sets, with lens approximately 4 inches (102 mm) in diameter, designed to indicate status to both dock attendant

and truck driver. Equip system with steel control panel located at interior of dock that includes illuminated lights indicating status of exterior signal lights. Provide signal-light set and control panel at each location indicated for light communication system. Enclose exterior signal-light sets in steel or plastic housing with sunshade.

1. Manual Operation: System is activated by push button or switch located on interior control panel.
 - a. Locations: Dock doors with manual levelers. (These doors do not have truck restraints.)
 2. Automatic Operation: System is activated automatically by limit switch mounted on overhead door track. Provide on-off switch located on master control panel.
 - a. Locations: Dock doors with powered levelers.
 3. Mounting: Wall.
- J. Alarm: visual system indicating that rear-impact guard is not engaged, with manual reset.
- K. Materials:
1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 2. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from steel plate complying with ASTM A572/A572M, Grade 55 (380).
 3. Steel Tubing: ASTM A500/A500M, cold formed.
 4. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- L. Truck-Restraint Finish: Manufacturer's standard electrodeposited zinc coating.
- M. Accessories: Interlock to dock leveler.

2.4 FINISH REQUIREMENTS

- A. Finish loading dock equipment after assembly and testing.
- B. Hot-Dip Galvanizing: Comply with the following:
 1. ASTM A123/A123M for iron and steel loading dock equipment.
 2. ASTM A153/A153M or ASTM F2329/F2329M for iron and steel hardware for loading dock equipment.
- C. Spray Zinc Metallizing: ASTM B833.
- D. Electrodeposited Zinc Coatings: ASTM B633.
- E. Steel Prime Paint Finish: Clean, pretreat, and apply manufacturer's standard primer.
- F. Baked-on Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 1. Color: Manufacturer's standard.
 2. Toe Guards: Paint to comply with ANSI Z535.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install loading dock equipment as required for a complete installation.
 - 1. Rough-in electrical connections.

3.2 INSTALLATION OF RECESSED LOADING DOCK LEVELERS

- A. Attach dock levelers securely to loading dock platform, flush with adjacent loading dock surfaces and square to recessed pit.

3.3 INSTALLATION OF TRUCK RESTRAINTS

- A. Attach truck restraints in a manner that complies with requirements for arrangement and height required for device to engage vehicle rear-impact guard. Interconnect control panel and signals with dock leveler.
 - 1. Pit-Mounted Units: Anchor truck restraints to concrete pit with expansion anchors and bolts or to mounting plate welded to pit angles per manufacturer's instructions.

3.4 ADJUSTING

- A. Adjust loading dock equipment to function smoothly and safely, and lubricate as recommended by manufacturer.
- B. Test dock levelers for vertical travel and adjust to maintain operating range indicated.
- C. After completing installation of exposed, factory-finished loading dock equipment, inspect exposed finishes and repair damaged finishes.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain loading dock equipment.

END OF SECTION 111319

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SECTION 11 3100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Cooking equipment including:
 - a. Microwave oven.
 - 2. Refrigerator.
 - a. Full Size
 - b. Undercounter Refrigerator
 - 3. Dishwasher.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.
- B. Warranties: Special warranties specified in this Section.

1.3 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
 - 1. Microwave Oven: Five-year limited warranty for in-home service on defects in the magnetron tube.
 - 2. Refrigerator/Freezer: Five-year limited warranty for in-home service on the sealed refrigeration system.
 - 3. Dishwasher: Five-year limited warranty for in-home service.

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. Basis-of-Design Product: The design for each residential appliance is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
 - a. GE Appliances
 - b. Whirlpool
 - c. Maytag

- d. Frigidaire
- e. LG

2.2 COOKING APPLIANCES

- A. Microwave Oven, Countertop 1.5 cu. Ft. Microwave Oven:
 - 1. Basis-of-Design Product: GE® Profile™ Series 1.5 Cu. Ft. Countertop Convection/Microwave Oven Model PEB9159SJSS with 27” Trim Kit JX9152SJ or Architect approved equal.
 - a. Trim Kit in the following locations:
 - 1) Commons 118
 - b. Countertop mounted in the following locations:
 - 1) Staff Break Room 108
 - 2) Classroom 141 / Life Skills Classroom

2.3 DISHWASHER

- A. ADA Under Counter Dishwasher:
 - 1. Basis-of-Design Product: GE Stainless Steel Interior Dishwasher with Hidden Controls. GE Model # GDT226SSL or Architect approved equal.
 - a. ADA Height for installation under a 34” countertop
 - b. ADA Compliant
 - c. NSF Certified Sanitize Option
 - d. Energy Star

2.4 REFRIGERATION APPLIANCES

- A. Full Size Refrigerator, 21.8 cu. Ft. Side by Side Refrigerator:
 - 1. Basis-of-Design Product: GE® 21.8 Cu. Ft. Counter-Depth Side-By-Side Refrigerator GZS22IYNFS or Architect approved equal. Provide Fingerprint resistant stainless-steel.
- B. Under Counter Refrigerator:
 - 1. Basis-of-Design Product: U-Line 24” Glass Door Refrigerator, Model # ADA 24 RGLS-13B. Stainless Frame, field reversible door swing.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Stainless-Steel Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including ground and polished stainless-steel surfaces for uniform, directionally textured finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

3.3 CLEANING AND PROTECTION

- A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from residential appliances and leave units in clean condition, ready for operation.

END OF SECTION 11 3100

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SECTION 114000 – FOODSERVICE EQUIPMENT

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.
- B. It is specifically noted that the Foodservice Consultant generated work is defined as the planning and design of all CSI Section 114000 foodservice and equipment (as defined by the Construction Specification Institute of America - Alexandria, Virginia). This excludes the actual construction or installation of this equipment, work by “other divisions” including but not limited to millwork, interior design elements, i.e. furniture, bars, bar tops and dies, service stations, graphic, signage, lighting, and audio/visual systems work and the like, as well as structural, programs, and all base project mechanical, electrical, and plumbing requirements not directly associated with Section 114000 equipment and called out on project construction documents as part of its work. Prior to installation all work shall be field verified by the Kitchen Equipment Contractor and construction documentation shall be designated “for planning and guidance”. The fully dimensioned and field verified Construction documentation will be provided by the Kitchen Equipment Contractor as part of the Submittal Process.
- C. The following information is provided for reference only and may not be totally inclusive for each specific trade noted. It is each trade’s responsibility to ensure that it covers all elements of its work that may affect the final foodservice equipment installation.
- D. No responsibility is accepted by the Architect or Consultant for the placement or replacement of equipment by Owner, or Others, its' utilities, or structural impact on the project where the equipment is furnished by others including the Owner outside of this contract or where existing equipment may be reused and moved or kept on the same location by the Owner or others, where this equipment has been specifically identified as NIC (not in contract) at any time during the project work

1.2 SUMMARY

- A. This Section includes equipment for foodservice facilities indicated on the Drawings.
- B. Kitchen Equipment Contractor furnished equipment.
 - 1. Furnish and install includes the work as follows, but not limited to:
 - 2. Furnish all labor, materials and services necessary for the assembly and setting in place of the equipment in strict compliance and in accordance with the contract documents. Coordinate requirements for wall reinforcements and special support locations.

3. Provide stands and supports for equipment requiring such. In areas requiring seismic bracing and provide special support to comply with seismic standards. (Such supports shall be approved by the structural engineer.)
4. Cut holes, provide sleeves for pipes in equipment, for drains, electrical work, plumbing work, etc., as required for proper installation. Any base building work required to be coordinated through the Contractor.
5. Repair any damage to equipment or to work of other trades resulting from installation per methods defined in the specification section of the work that is damaged
6. Remove all debris resulting from this installation, clean, repair, and adjust all equipment for operation, as well as provide an acceptance test to the Owner
7. Contractor shall avail itself and pass directly on to Owner all lawful rebates, refunds, 'spiffs', credits, and discounts afforded it by virtue of its contract with the manufacturers providing equipment to this section of work, acquired or made available thru the use or application of the Owner's funds.

C. Owner-Furnished Equipment: Where indicated, Owner will furnish equipment items.

D. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for the following:
2. Equipment bases.
3. Requirements for slab depressions.
4. Insulated slabs beneath walk-in refrigeration units.
5. Division 05 Section "Metal Fabrications" for equipment supports.
6. Division 06 Section "Interior Architectural Woodwork" for custom casework and countertops.
7. Division 07 Section "Roof Accessories" for roof curbs and equipment supports.
8. Retain first subparagraph below if field-installed floor finishes are required for walk-in refrigeration units.
9. Division 09 Section "Tiling" for floor finishes in walk-in refrigeration units.
10. Division 21, 22, and 23 Sections for supply and exhaust fans; exhaust ductwork; service roughing-ins; drain traps; atmospheric vents; valves, pipes, and fittings; fire-extinguishing systems; and other materials required to complete foodservice equipment installation.
11. Division 23 Section "Air Curtains" for air curtains protecting foodservice facility entranceways.
12. Division 23 Section "Commercial Kitchen Hoods" for ventilation hoods.
13. Division 26 Sections for connections to fire alarm systems, wiring, disconnect switches, and other electrical materials required to complete foodservice equipment installation.

E. Foodservice Contract Documents:

1. Equipment drawings are definitive only and shall not be used as construction documents or shop details
2. Drawings and equipment specifications are intended to compliment each other. Therefore, neither should be considered complete without the other
3. Drawings are for reference, assistance and guidance only. Drawings indicate the preferred final location of equipment. The exact final location will be dictated by the building conditions

4. Reproduction of Contract documents prepared by either the Architect or Consultant by any means will not be acceptable as Shop Drawings. Drawings submitted as original KEC drawings having the appearance of being copies or modified versions of the original Contract Documents will be returned as being non-conforming to submittal requirements

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 1. Manufacturer's model number.
 2. Options, accessories, and components that will be included for Project.
 3. Clearance requirements for access and maintenance.
 4. Utility service connections for water, drainage, power, and fuel; include roughing-in dimensions.
 5. Cut Sheet Book: Assemble PDF set of Equipment Brochure books as part of the submittal. NOTE: Show all specified accessories, utility requirements and all other pertinent information on equipment cuts. Every item of equipment will have a cut sheet. The words 'See Drawing' are not acceptable. Improperly prepared or incomplete cut sheet books will be returned without comment. One book will be marked, stamped with required action noted and returned with submittal drawings for appropriate action and copying for distribution
- B. Shop Drawings and Kitchen Equipment Contractor Rough-In Drawings prepared by persons highly skilled in preparation and presentation of architectural and engineering type drawings, charts, schedules and other related graphic illustrations and representations. Include plans, elevations, sections, roughing-in dimensions, fabrication details, utility service requirements, and attachments to other work. The shop details, rough-in drawings, and any other submittals for this section are to be submitted at the same time in a single package. Partial submittals will be held without action until the remainder of the submittals have been received. The consultant reserves the right to withhold action on submittals requiring cross-coordination with other submittal items until related submittals are received. If after 10 days there is no direction given, the Architect will be contacted for return instructions.
 1. Shop Details: Submit PDF set of shop drawings of all fabricated equipment at minimum 3/4" = 1'-0" scale. Include with all custom fabrication drawings dimensions, fabrication methods, materials, thickness, details of construction, installation, method of field joints noted, and a full Bill Of Materials (BOM). Shop details must indicate reinforcements, methods of anchorage and quality of finishing. This PDF set will be reviewed, marked, stamped with required action noted and returned for appropriate action and copying for distribution. Contractor shall verify all field dimensions and incorporate them into shop drawings. Shop drawings must be project specific

2. Rough-in Drawings: Submit PDF set of complete and detailed rough-in drawings. Drawings will be professionally drawn and will be at a scale of 1/4" = 1'-0", and shall show every piece of equipment, all dimensions for rough-in points for electrical, plumbing, steam, exhaust, gas, thermos-fluid, refrigeration, wash down hoods, as well as concrete curbs, sleeves, supports, etc. and all core drilling needed. The vellums will be reviewed, marked, stamped with required action noted and returned for appropriate action and copying for distribution
3. All drawings will be rolled and shipped in a protective container to assure arrival in a damage free condition
4. PDS set of submittals, reviewed and accepted or rejected, will be retained by the Consultant as a record and reference set
5. Record drawings, if required by the owner, will be prepared in AutoCAD Version 2010 or newer, within 10 working days of the final punch. Drawings will be submitted electronically to the consultant for inclusion in the record drawing set not later than 15 working days from the final punch date
6. Equipment drawings are definitive only and shall not be used as construction documents or shop details
7. Allow sufficient time for review so that the installation will not be delayed as a result of the time required to process submittals, including time for re-submittals.
8. Within 15 working days of award of contract, submittals are required to be submitted.
9. Allow 15 working days for initial review. Allow additional time if processing requires additional submittal material for coordination (incomplete submittals). Consultant will advise the Architect in a timely manner when additional time is necessary to process submittals, including the reason for the delay.
10. Allow 15 working days for initial review. Allow additional time if processing requires additional submittal material for coordination (incomplete submittals). Consultant will advise the Architect in a timely manner when additional time is necessary to process submittals, including the reason for the delay.
11. Intermediate submittals are processed on the same time basis as the initial submittal.
12. Allow 10 days for reproduction of submittal materials.
13. No extension of Contract Time will be allowed because of failure of the Kitchen Equipment Contractor to transmit submittals complete and on time in order for the Architect and Consultant to properly process submittals.
14. Coordination Drawings: For foodservice facilities.
15. Indicate locations of foodservice equipment and connections to utilities.
16. Key equipment using same designations as indicated on Drawings.
17. Include plans and elevations; clearance requirements for equipment access and maintenance; wall backing, details of support for equipment; and utility service characteristics.
18. Delete subparagraph below if not required.
19. Include details of seismic bracing for equipment as required by local authority.
20. Samples for Initial Selection: For units with factory-applied color finishes.
21. Delete paragraph above if colors are preselected and specified or scheduled. Retain first paragraph below with or without above.
22. Samples for Verification: For each factory-applied color finish required, in manufacturer's standard sizes.

- C. Operation and Maintenance Data: For foodservice equipment to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 include the following:
1. Within ten (10) working days of Final Punch, Furnish, and deliver to the General Contractor, eight (8) service/parts and maintenance manuals for all equipment supplied as part of this contract. The General Contractor will route one (1) copy to the Consultant for review. This copy will be returned with comments as necessary:
 2. Product Schedule: For each foodservice equipment item, include the following:
 - a) Designation indicated on Drawings.
 - b) Manufacturer's name and model number.
 - c) Prepare a list of service agencies authorized by each manufacturer to service its equipment. Include within this listing the name of the person to contact and a telephone number for reference purposes. One copy of the Service Agency List will be included in each manual.
- D. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. NSF Standards: Provide equipment that bears NSF Certification Mark or UL Classification Mark, permanently affixed to the device or equipment, certifying compliance with applicable NSF/ANSI standards.
- B. BISSC Standards: Provide bakery equipment that complies with BISSC's "Sanitation Standards for the Design and Construction of Bakery Equipment and Machinery."
1. See "Health and Sanitation Requirements" Article in the Evaluations for a discussion of BISSC certification.
 2. Provide BISSC-certified equipment.
- C. UL Certification: Provide electric and fuel-burning equipment and components that are evaluated by UL for fire, electric shock, and casualty hazards according to applicable safety standards and that are UL certified for compliance and labeled for intended use.
- D. Steam Equipment: Provide steam-generating and direct-steam heating equipment that is fabricated and labeled to comply with ASME Boiler and Pressure Vessel Code.
- E. Check and confirm that drawings and specifications meet all Federal, State and local government body regulations. The drawings and specifications govern wherever they have larger sizes or higher standards than required by such regulations. Applicable regulations will govern when they are more restrictive or require higher standards than requested by the Contract Documents. All costs for compliance with said regulations shall be borne by the Kitchen Equipment Contractor regardless of what is contained in the Contract Documents
- F. Subway grating when used on floor troughs must meet IBC 1104.3.1, ANSI Ch 4, and 28 CFR Part 36, Para 4.5.4.
- G. Regulatory Requirements: Install equipment to comply with the following:
1. ASHRAE 15, "Safety Code for Mechanical Refrigeration."

2. NFPA 54, "National Fuel Gas Code." NFPA 54, "National Fuel Gas Code."
3. NFPA 70, "National Electrical Code."
4. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations."
5. U.S. Public Health Service
6. Local Health Department
7. O.S.H.A
8. National Sanitation Foundation (N.S.F.)
9. A.G.A
10. A.S.M.E.
11. A.S.T.M.
12. ADA (CFR Part 36)
13. Any other jurisdictional agency not listed.

H. Seismic Restraints: Comply with SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines," Appendix A, "Seismic Restraint Details," unless otherwise indicated.

1. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Coordination Drawings.
- B. Kitchen Equipment Contractor will verify all building conditions and coordinate with the General Contractor proper access of large equipment to the building prior to close of bidding. Costs for any specific items or equipment required for the movement of large, heavy or bulky equipment including rigging, cartage, etc. is solely the responsibility of the Kitchen Equipment Contractor

1.6 COORDINATION

- A. Coordinate foodservice equipment layout and installation with other work, including lighting fixtures, HVAC equipment, and fire-suppression system components.
- B. Coordinate location and requirements of utility service connections.
- C. Coordinate size, location, and requirements of the following:
 1. Overhead equipment supports.
 2. Equipment bases.
 3. Floor depressions.
 4. Insulated floors.
 5. Floor areas with positive slopes to drains.
 6. Floor sinks and drains serving foodservice equipment.
 7. Roof curbs, equipment supports, and penetrations.

1.7 WARRANTIES

- A. Minimum Warranty Period for all foodservice equipment will be parts and labor for one (1) year after substantial completion. All repairs and replacements will be made as required without charge to the owner within the warranty period.
- B. Refrigeration Compressor Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace compressors that fail in materials or workmanship within specified warranty period.
 - 1. Refrigeration systems shall include start-up and one (1) year parts and labor warranty as stated herein plus an additional four (4) year warranty on all refrigeration compressors. This includes compressors for refrigerators, ice cream cabinets, icemakers, freezers, dispensers, and all other refrigerated items.
 - 2. Failure includes, but is not limited to, inability to maintain set temperature.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Supplemental to the base bid for the prime equipment as specified, the Contractor may propose substitution (alternate) equipment other than that specified. The Contractor must clearly and separately state that they are offering an alternate. The Contractor shall submit a letter of explanation addressing the advantages of substitution for each piece of equipment to be substituted not less than 10 working days prior to close of bidding, one copy of an original manufacturer's cut sheet, complete illustrations, specifications, capacities, and utilities, as well as all applicable operational data for all proposed alternates as well as applicable price differences. It is the Contractor's responsibility to prove that the item or items submitted as alternates are equal to the prime specified items. The Owner with counsel from the Food Service Consultant will be the final determining authority as to acceptability or equality of alternates. Items of standard equipment must be the latest model and new at time of delivery. Approval prior to the bid date to submit alternates is not required. At a time requested in writing by the Owner and/or the Foodservice Consultant, the Contractor will be responsible for determining all relative costs associated with the use of alternate equipment. The net savings (gross foodservice equipment price deduct less base building/engineering modifications) resulting from the use of alternate equipment will be a factor in the evaluation of the acceptability of the alternates. Upon approval, a list of approved alternates, not requiring further approval, will be published and distributed to all bidders at least five (5) days prior to close of bidding. It is understood that the alternate equipment will be provided 'same-as' that originally specified
- B. The base bid shall include all prime equipment specified. Including specific manufacturer, model number, size, utilities requirements, capacities, etc., as well as options and accessories.
- C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
5. Basis-of-Design Product: The design for foodservice equipment item is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 FABRICATED EQUIPMENT

A. Materials:

1. Stainless Steel: ASTM A 666. Stainless Steel: Stainless steel shall be of U.S. Standard gauges as indicated, but not less than 20 gauge, Type 304 with No. 4 finish.
2. Galvanized Steel: ASTM A 653/A 653M. Galvanized Steel: Galvanized Steel shall be of 14 gauge or as otherwise indicated on drawings or specifications and shall be hot dipped -galvanized. Galvanized steel may be used in all non-exposed areas, areas with no contact with food or serving items and in framework. When used in framework, galvanized steel shall be of welded construction (welding is to be done before galvanizing). Use of galvanized steel will be subject to final approval during submittal check. K.E.C. fabrication drawings will clearly identify location(s) of all galvanized components.
3. Insulation Materials: For normal temperature applications, such as custom fabricated under-counter refrigerators, use extruded polystyrene material 2 in. (50 mm) thick, bonded at all joints
4. For low temperature applications, such as ice bins, cold pans, or custom fabricated under counter freezers, use urethane, rigid foam board or foamed-in-place, not less than 2 in. (50 mm) thick, except that vertical surfaces of cold pans and ice bins may be 1 in. (25 mm) thick. Bond insulation at joints to prevent condensation on exterior
5. At counter tops subject to heat from cooking equipment and/or refrigeration compressors, use 1 in. (25 mm) thick Manville Martinite 36, or equal, to insulate underside of top. Also add Martinite material between freezer or refrigerator and 14 gauge (1.98 mm) stainless steel top
6. Fiberglass insulation materials shall not be used. Insulation shall be bonded to all surfaces

B. Miscellaneous Metals:

1. Kitchen Equipment Contractor will provide and install 22 gauge stainless steel wall flashing from the top of floor cove base to under the lowest point of the exhaust hood(s). Flashing will extend the full width of the exhaust hood. 22ga stainless steel wall flashing will be installed from the top of the backsplash to the base of wall shelves at all sinks and work tables with sinks unless otherwise stated. Corner Guards (14ga Stainless Steel, 48" high, 4" x 4", broke at 90°, with a 5° return brake) will be installed at all outside corners of the foodservice areas. 90° brake angle will be adjusted to match the actual angle of the walls. Base of the corner guards will be at the top of the floor cove base. K.E.C. will provide and install all necessary trim panels and closures, including cosmetic coverings. Equipment closures will match the individual equipment finishes
- C. General requirements for fabricated equipment:
1. Fabrication methods shall conform to all generally accepted conventions and requirements of the food service industry and shall meet or exceed the latest National Sanitation Foundation standards including all revisions
 2. Fabricated equipment will be manufactured to meet the intended needs of the final application. The Kitchen Equipment Contractor is responsible for reviewing the submittal drawings and monitoring the progress of the equipment during fabrication to insure that adequate oversight is maintained. Any potential variance from the design or intended purpose must be reported to the General Contractor immediately. The Foodservice Contractor is specifically charged with providing a fully functional, maintainable, and purpose compliant device that meets the expectations of the owner
 3. Fabricated equipment approved as an alternate to specified factory manufactured will be constructed to match exactly the prime specified equipment
 4. Metal tops to be one-piece 14 gauge stainless steel welded construction or as indicated on drawings or specifications, including field joints. Tops to be secured to a full perimeter galvanized steel channel frames except at wood top tables, drainboards and dishtable where channel frames shall be stainless steel and cross braced not farther than 30 in. (760 mm) on center. Fasten top with stud bolts or tack welds. Coat underside of tops with a minimum 1/16 in. (1.6 mm) thick approved hard-drying, sound-deadening, mastic material. Apply all coatings by spreading after top has been secured to frame, such that top and frame are covered and sealed. Table tops must not deflect or distort when fully loaded
 5. Fabricate bases from not less than 18 gauge (1.27 mm) steel reinforced by forming metal ends and shelves. Partitions to be constructed of stainless steel. The ends and vertical partitions can be of single wall construction, with a 2 in. (50 mm) face partitions and sides shall be welded at intersections and be flush with the bottom edge of the bottom shelf
 6. Unexposed cabinet backs and structural members will be stainless steel
 7. Legs and cross rails to be of 1 5/8 in. diameter (941 mm), 16 gauge (1.59 mm) seamless stainless steel tubing. All cross rails to be continuously welded, ground and polished. Tack welds or other methods of connection are not acceptable. Bottoms of legs to be wedged inward and fitted with a stainless steel bullet-type foot with not less than 2 in. adjustment. Freestanding legs are to be pegged to floor with 1/4 in. (6 mm) diameter stainless steel rods

8. Stainless steel gussets shall not be less than 3 in. (76 mm) diameter and 3/4 in. (95 mm) long. Outer shell to be 16 gauge (1.59 mm) stainless steel reinforced with 12 gauge (2.78 mm) mild steel insert welded to interior of shell. Gusset to be large enough to accommodate a 1-5/8 in. (41 mm) tube and shall have an Allen screw fastener
9. Low counter legs shall be constructed of stainless steel exterior and shall be 5 3/4 in. (146 mm) minimum height or 7 in. (178 mm) maximum height with 3 1/2 in. (89 mm) square plate with four countersunk holes, welded to the top for fastening
10. Adjustable feet to be constructed of stainless steel 1/2 in. (38 mm) diameter tapered at the bottom to 1 in. (25 mm) diameter, fitted with a 3/4 in. (19 mm) cold-rolled rod threaded for minimum of 1/2 in. (38 mm) for fitting into a threaded plug welded to leg. A push-in foot is not acceptable. Tables with utilities will have flanged feet and will be securely bolted to the floor with stainless steel fasteners as required by local code
11. When legs are fastened to equipment, the following methods must be used:
 - a) Sinks: Gussets shall be welded to triangular stainless steel plates, which in turn shall be welded to the underside of sink
 - b) Metal Top Table or Dish table: Gussets shall be welded to 14 gauge or heavier channel reinforcing.
 - c) Wood Top: Gusset shall be welded to a stainless steel channel of not less than 14 gauge stainless steel (1.98 mm), secured to the top with screws through slotted holes.
12. Shelves:
 - a) When shelves are part of the fixture, the following must take place.
 - b) Open base type shelf shall be notched around the leg and continuously welded to the leg.
 - c) Cabinet base type shelf shall be turned-up 2" on the back side with a minimum of 1/4 in. (6 mm) radius to insure a tight fit to enclosure panels.
13. Wall mounted shelves:
 - a) The KEC will insure and obtain written verification that the General Contractor provides and installs wall backing of sufficient size and strength to support the intended fixture when fully loaded or at full capacity. KEC will also provide a separate dimensioned drawing for approval that outlines the location of all wall backing required and the intended material to be used.
14. Sinks, Steam Tables, and Bain Maries:
 - a) When multiple compartments are part of the design, they shall be continuous on the exterior without applied facing strips or panels. Bottoms of each compartment to be creased to ensure complete drainage to waste opening
 - b) Partitions between compartments to be double thickness, continuous and welded
 - c) Where sink bowls are exposed, the exterior shall be polished to a number 4 finish
 - d) Faucets will be by Fisher Mfg. Co. or equal by Standard Keil, T&S or Chicago shipped loose for installation by the G.C. of the Plumbing Contractor. Janitors Sink Service Faucet - 8253. Pot Sinks - 5414, Pre-Rinse - 13382, 1/2" Faucet - 13250, Pot Sinks - 5414, Rotary Waste -

- 28940, Basket Waste - 30376, Bain Marie - 1731-1 Left, unless otherwise noted.
- e) Water stand Bain maries shall be fitted with Fisher 28940 rotary waste with flat strainer, connected overflow and adapter to connect to 1-1/2 in. (38 mm) drain line.
 - f) Furnish faucets for all sinks, Bain maries, water stations and other fixtures per 'D & E' above. If not otherwise specified, all faucets will be backsplash mounted
15. Provide vacuum breakers on equipment requiring them as furnished under this contract in accordance with governing codes.
16. Refrigeration Compressors and Evaporators:
- a) All Walk-In refrigeration condensing units and evaporator coil assembly shall include pre-wiring, pre-piping, crankcase regulator, head pressure regulator, factory-installed suction line accumulator, phased loss protection, interconnecting refrigerant lines, five year warranty, main fuse disconnect, structural steel frame and weather-proof carbon steel body panel with epoxy paint finish, and refrigerant detective alarm.

2.3 BY PURVEYOR, BY OPERATOR, OR EXISTING EQUIPMENT

- A. Any and all food service equipment and equipment systems noted as "by owner", "by purveyor", "by operator" or "existing" in the food service construction documents are presented for reference only. These representations must be verified in writing by the kitchen equipment contractor, owner, operator, and/or general contractor prior to the release of "for construction" documentation. It will be the general contractor's responsibility to further verify and coordinate all necessary information pertaining to this equipment or systems making up, or relating to, this equipment including, but not limited to, local health department regulations, local sanitation code requirements, mechanical, structural, plumbing and electrical requirements prior to commencement of construction. Consultant or Architect take no responsibility for design, intent, function, performance, utility requirements, or code compliance of non-specified equipment
- B. Equipment listed as 'Existing' and identified for re-use will be removed from current location, thoroughly cleaned (steam cleaning preferred), refinished (including, but not limited to polishing and painting), lubricated, adjusted, functionally tested, and all knobs, handles, and fixtures replaced. Equipment will have the appearance of extensive reconditioning, and be ready to be placed into service.

2.4 MISCELLANEOUS MATERIALS

- A. Installation Accessories, General: NSF certified for end-use application indicated.
- B. Elastomeric Joint Sealant: ASTM C 920; Type S (single component), Grade NS (non-sag), Class 25, Use NT (non-traffic) related to exposure, and Use M, G, A, or O as applicable to joint substrates indicated.

1. Public Health and Safety Requirements:
 - a) Sealant is certified for compliance with NSF standards for end-use application indicated.
 - b) Washed and cured sealant complies with the FDA's regulations for use in areas that come in contact with food.
 - c) Cylindrical Sealant Backing: ASTM C 1330, Type C, closed-cell polyethylene, in diameter larger than joint width.
2. Trimming and sealing of equipment:
 - a) Any space between units to walls, ceilings, floors and adjoining non-portable units shall be completely sealed against entrance of food particles or vermin by means of trim strips, welding, soldering, or commercial joint material suitable to the nature of the equipment and acceptable to Architect.

2.5 OTHER CUSTOM FABRICATED COMPONENTS

- A. Casters: Shall be heavy-duty type, ball-bearing, solid or disc wheel with non-marking greaseproof rubber, neoprene or polyurethane tires as specified.
- B. Wheels shall be 5 in. (127 mm) diameter or as specified, minimum width of tread 2 1/2 in. (30 mm), with a minimum capacity per caster of 250 lbs. (113.4 kg), unless otherwise specified.
- C. Solid material wheels shall be provided with stainless steel rotating wheel guards.
- D. Shall be sanitary, have sealed wheel and swivel bearings and polished plate finish (per N.S.F.-7).
- E. Doors: Metal doors shall be double-cased stainless steel. Outer pan shall be 18 gauge (1.27 mm) stainless steel with corners welded, ground smooth, and polished. Inner pan shall be 20 gauge (.95 mm) stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or extruded polystyrene used as a core. The two pans shall be tack-welded together and joints solder-filled. Doors shall be finished approximately 3/4 in. (19 mm) thick, and be fitted with flush recessed type stainless steel door pulls.
- F. Sliding doors shall be self-closing, mounted on large, quiet ball-bearing rollers in 14 gauge (1.98 mm) stainless steel overhead tracks and be removable without the use of tools. Bottom of cabinet to have stainless steel guide-pins and not channel tracks for doors.
- G. Wood doors to be custom fabricated as detailed. All sides and edges shall be laminated.
- H. Hinged doors to be mounted on heavy-duty N.S.F. approved hinges, Model #2970-1010-1250 by Standard Keil or as noted on plans or specifications.
- I. Hardware: Shall be solid, heavy-duty type.
- J. Identify manufacturer's name and number so that broken or worn parts may be replaced.
- K. Submit samples for approval, when requested.

- L. Pulls shall be Standard Keil Hardware, or approved equal as follows:
- M. Door Pulls - Model No. 1263-1010-1283
- N. Drawer Pulls - Model No. 1263-1012-1283
- O. Disherwells: Disherwells shown on drawings or specified shall be Fisher Mfg. Co. Model 3041 or equal by Standard Keil.
- P. Drawer Assemblies: Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with padlock hasp.
- Q. Slide assembly shall consist of one pair of stainless steel roller bearing, self closing extension slides with side and back enclosure panels, front spacer angle, two drawer carrier angles secured to slides and stainless steel front.
- R. Slides are to be Model No. 3320-22 (250 lb. capacity fully extended) (113.4 kg) made by Grant Pulley and Hardware Co., or equal.
- S. Drawer bodies for general storage shall be 20" X 20" (508 mm X 508 mm) or as specified with Royalite containers as manufactured by United States Rubber Co.
- T. Drawers intended shall hold food products to be removable type with 12" x 20" (305 mm X 508 mm) stainless steel assembly.
- U. Drawer fronts shall be double cased, 3/4 in. (19 mm) thick, with 18 gauge (1.27 mm) stainless steel welded and polished front pan. Stainless steel back pan is shall be tightly fitted and tack welded. Sound deaden with rigid insulation.
- V. Provide all drawers with replaceable soft neoprene bumpers or, for refrigerated drawers, a full perimeter soft gasket.

2.6 CUSTOM FABRICATED WORKMANSHIP

- A. Items of custom fabricated equipment must be custom fabricated by an acceptable manufacturer, who is N.S.F. approved and custom fabricated in an approved manner to the complete and final satisfaction of the Contractor.
- B. Welding and Soldering: Materials 18 gauge (1.27 mm) or heavier, shall be welded.
- C. Seams and joints shall be shop-welded or soldered as the nature of the material will require.
- D. Welds shall be ground smooth and polished to match original finish.
- E. Where galvanizing has been burned off, the weld shall be cleaned and touched up with high-grade aluminum paint.

- F. Fasteners and Joints: The following will not be accepted:
- G. Exposed screw or bolt heads.
- H. Rivets.
- I. Butt joints made by rivetting straps under seams and then filled with solder.
- J. All fasteners exposed to moisture will be stainless steel.
- K. Rolled Edges: Rolled edges to be as detailed, with corners bullnosed, ground and polished.
- L. Coved Corners: All stainless steel food service equipment shall have 3/4 in. (15 mm) or larger radius coves in all horizontal and vertical corners and intersections per N.S.F-7. standards.
- M. Closures: Where ends of fixtures, backsplashes, shelves, etc. are open, fill by forming the metal, or weld sections, if necessary, to close entire opening flush to walls or adjoining fixtures.
- N. Fabricated equipment having a specified manufacturer, if fabricated by another manufacturer; It shall be specifically understood that all standard accessories, construction details, and features, whether stated or not, will be met, and/or, provided by the current manufacturer.
- O. All shelf, counter, or other penetrations will have properly sized grommets installed and secured to prevent accidental removal.

2.7 OPERATION REQUIREMENTS

- A. Insure quiet operation of food service and related equipment. Provide sound deadening on all tables, counters, undershelves, sinks and drainboards.
- B. Insure bumper gaskets, stops, and any other protection is installed on all custom fabricated equipment as needed.

2.8 CONNECTION TERMINALS

- A. All custom fabricated equipment shall be provided with standard connection terminals to allow other contractors to make final connections on job site.

2.9 EXHAUST HOODS, WALK-IN COOLERS AND DISHMACHINES

Verify size and location of all connections required before fabrication.

- A. Check job site prior to installation of walk-in coolers to verify proper dimensions and for required trim.

- B. Provide all stainless steel duct connections and collars.
- C. 22 Gauge Stainless Steel Wall Flashing is required from the lowest point of the Exhaust Hood to the top of the cove base, and full width of the hood. All seams and edges will be fully finished. Overlap seams or raw edges are not acceptable.
- D. Fire dampers, if required, are to be provided by the KEC and installed by the Mechanical Contractor, and subject to the requirements of prevailing local codes.

2.10 INSERT PANS

- A. All cut-outs, openings, drawers, and equipment specified or detailed to hold stainless steel insert pans shall be provided with a full compliment of pans as follows:
- B. One (1) stainless steel, 20 gauge (.95 mm) minimum, solid stainless steel insert pan for each space, sized per plans, details, and specifications.
- C. Where pan sizes are not indicated in plans, details, or specifications, provide one full-size stainless steel pan to securely fit each opening.
- D. Provide a maximum depth pan to suit each application and space allocated for same.
- E. Provide 18 gauge (1.27 mm) removable stainless steel adapter bars where applicable.

2.11 TRAY SLIDES

- A. Verify the following before fabrication of counters with tray slides:
- B. Configuration of all corners, turns, and shape of tray slides for proper support and safe guidance of trays.
- C. Size and shape of tray to be used in operation.

2.12 ENCLOSURES

- A. Provide and install enclosure panels secured or removable as specified for any item which houses equipment with movable parts, i.e. compressors, pumps, etc. Also, cover and provide protection for any exposed steam line or condensate line, which may be within reach of operating personnel.

2.13 DISPENSER (SELF-LEVELING)

- A. Verify make of ware, their dimensions, and weight and submit to the dispenser manufacturer at earliest possible date so that springs may be properly calibrated.

2.14 WATER FILTER-PURIFIER

- A. Furnish in-line water filter-purifiers to remove contaminants, minerals, taste, or odors from beverage system, coffee urns, and icemakers, and steamers, manufactured by Everpure or equal. Provide proper size filter - purifier for equipment being supplied. Locate to insure easy access for cartridge replacement.

2.15 ELECTRICAL WORK - GENERAL REQUIREMENTS

- A. Before ordering equipment, confirm with the Contractor, all pertinent electrical requirements such as actual voltages available, number of phases and number of wires in the system.
- B. Electrical work for custom fabricated equipment shall be completely wired by this Contractor to a junction or pull box, easily accessible, mounted on the equipment. Wiring shall be labeled for outlet or item served.
- C. Components and assemblies shall bear the U.L. label or be approved by the prevailing authority.
- D. Provide custom fabricated and standard refrigerated units with vapor tight receptacles, shatterproof lamps and automatic switches. All wiring to be concealed.
- E. Electrical Contractor shall provide all code conforming electrical receptacles serving applicable Section 11400 Foodservice Equipment.
- F. Electrical Contractor shall provide and install shunt trip breakers as required.
- G. Electrical Contractor shall provide and install spiral wrap heat tape at the rate of 6W per foot on condensate drain lines in all walk-in freezers.

2.16 INTERNAL WIRING OF FIXTURES AND EQUIPMENT

- A. Contractor shall be responsible for internal wiring of electrical devices, and shall build them into or form them as an integral part of the custom fabricated equipment items. Wiring to be placed in metal conduit to a pull box tagged for intended use. Check with the Contractor for color-coding of wiring.
- B. Each standard item shipped in sections shall be properly connected internally and verified.
- C. Provide dishwashers and conveyors internally wired to junction box or distribution panel as specified, including push button switches, motors, immersion heaters, solenoids, etc.

- D. Where light fixtures are specified or detailed as part of counters, cases or fixtures, light fixtures and lamps to be provided unless otherwise specified. If fluorescent light fixtures are specified, all ballasts shall be included.
- E. Wiring for built-in strip heaters or immersion-type elements shall be provided as follows:
- F. In heat zone, have U.L. approved insulation and not less than 300 volt rated with nickel wire.
- G. Connection wiring extended in raceway or conduit to junction or pull box shall not be less than 600 volt rated A.V.A. insulation covered wire, U.L. approved, or equal.
- H. Wiring for custom fabricated refrigerator and freezer cabinets shall be U.L. approved, insulated cable from exterior junction box to internal components within insulation, unless code requires metallic conduit:
- I. Conduit shall be Electrical Metallic Tubing, rigid or flexible (Greenfield). For freezer applications, Seal Tite Flex or approved equal shall be used.
- J. Internal wiring shall be U.L. approved rubber covered 600 volt rated conductor except door heaters, which shall be nichrome wire with silicone braided jacket having resistance of 10.4 watts per lineal foot.
- K. Convenience outlets, lighting receptacles (rubber or porcelain), and door switches shall be mounted in approved boxes. Convenience outlets for evaporators shall be twist-lock type. Solid connections as for freezer evaporators shall be made vapor tight.
- L. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed "Seal-Tite" conduit equal to Anaconda type "UV" U.L. approved, complete with approved liquid-tight connectors on each end, designed to provide electrical grounding continuity.
- M. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) will not be permitted for wet areas. Exposed outlet boxes shall be liquid-tight with thread hubs.

2.17 CONVENIENCE AND POWER OUTLETS

- A. Make cut-outs and install appropriate boxes or outlets in custom fabricated fixtures complete with wiring conduit, outlet and cover plate.
- B. All outlets and plugs shall conform to NEMA standards. Convenience (and all 120V outlets) will be NEMA 5-20R, horizontally mounted.
- C. All electrical outlets and devices shall be first quality "Specification Grade."

2.18 PLUGS AND CORDS

- A. Where cords and plugs are used, they must comply with National Electrical Manufacturer's Association (NEMA.) requirements.

2.19 HEATING EQUIPMENT

- A. Electric and heating equipment to be installed so as shall be readily cleanable or easily removable for cleaning.
- B. Steam-heated custom fabricated equipment shall be of self-contained assembly complete with control valves located in an accessible position.

2.20 STARTERS, SWITCHES AND CONTROLS

- A. Furnish all starters, motor controls, remote controls and transformers as required.
- B. Locate all switches out of heat zone.
- C. All starters, switches and controls shall have white on black phenolic plastic identification plates with stainless steel screws conspicuously located on adjacent surfaces.

2.21 REFRIGERATION

- A. Compressors and related components must be fully accessible for service and maintenance.

2.22 COLD PANS

- A. Ice pans, refrigerated pans and cabinets to be provided with breaker strips where adjoining top or cabinet face materials, to prevent transfer of cold.

2.23 VENTILATION OF REFRIGERATED EQUIPMENT

- A. Adequate air supply and exhaust shall be provided for all self-contained or remote refrigeration condensing units, both custom fabricated and standard, as required for proper operation.
- B. If additional ventilation is required to ensure correct operating temperatures, so state in a letter to the Contractor for evaluation and decision before purchase/fabrication.

2.24 COMPONENTS

- A. Coils: Coils for standard and custom fabricated refrigerators to have vinyl plastic coatings, stainless steel housings and shall be installed in such a manner as to be replaceable.
- B. Expansion Valves: Standard reach-in refrigerators and freezers, for remote refrigeration systems, shall be complete with thermostatic expansion valves at the evaporator.
- C. Thermometers: Refrigerated compartments, custom fabricated and standard, shall be fitted with flush digital type thermometers with chrome-plated bezels.
- D. Thermometers to be adjustable and shall be calibrated after installation.
- E. Thermometers shall have an accuracy of + 2oF. (1oC).
- F. Walk-in boxes will have digital alarms as noted in itemized specifications.
- G. Hardware: Refrigerator hardware for standard and custom fabricated refrigerator compartments shall be solid, heavy-duty components.
- H. Hinges must be self-closing.
- I. Latches shall be magnetic edge mount-type unless specified or detailed otherwise.
- J. Locks: Doors and drawers for reach-in refrigerated compartments, both custom fabricated and standard, to be fitted with cylinder locking type latches, and provided with master keys.

2.25 MANUFACTURERS' ITEMIZED EQUIPMENT

- A. The following equipment is to be provided with all necessary components and accessories necessary for operation unless otherwise stated. This includes, but is not limited to; Hoses, disconnects, cords, plugs, adapters, regulators, back flow prevention devices, filters, isolation mounts, seals, closures, fillers, or restraints.
- B. All fasteners will be stainless steel, and fastener heads will be burr free.
- C. Each of the following items is to be complete with all factory accessories and options included in the specified model as well as options, modifications, or accessories as listed. Each item will be of the size and shape as shown on the plan. Each will meet all applicable federal, state, and local code requirement(s).
- D. Equipment will be set in place per plan, and be fully operational unless otherwise directed.
- E. Equipment listed as existing will be thoroughly cleaned and inspected for functional serviceability. Defects will be noted and reported to owner for disposition.

- F. Equipment that attaches to walls, and has legs, will be attached to the wall under the backsplash with 'Z' clips every 32" or closer, and the legs pinned to the floor with stainless steel pins. All wall mounted equipment must have wall backing at the mounting points. Tables with utilities will have flanged feet bolted to the floor. The General Contractor will provide suitable wall backing located by the K.E.C. on the Building Conditions Plan Sheet(s).
- G. K.E.C. will provide and install wall bumpers wherever impact damage from mobile equipment is possible in addition to locations pre-designated on drawings. Wall bumpers will be by Boston Bumper.
- H. Gas connections will be 3/4" rear entry unless otherwise noted. Connection will be with a properly installed, correct length, (Dormont PN 1675KITCFS48 or equal) and an approved safety restraint cable.
- I. Shelving will be assembled first shelf ten inches (10") off floor, or as required by local code, with the balance of shelves equally spaced to top of post.
- J. All work must meet all applicable federal, state, and local laws, rules, regulations, and codes.
- K. Plate Lowerators, Tray Dispensers, and other dispensing type devices. KEC must confirm container or tray sizes required by owner or operator.
- L. Roof curbs for refrigeration equipment are coordinated by the KEC, sized by the refrigeration supplier, and provided by the General Contractor. Roof curbs for refrigeration equipment are coordinated by the KEC, sized by the refrigeration supplier, and provided by the General Contractor.
- M. Gas supply cut-off valves (considered part of the fire suppression system) will be supplied by the KEC and installed by the Mechanical Contractor. In every case the valves will be electrically tripped, and manually reset. Electric or automatic reset valves are not permitted. Gas supply cut-off valves (considered part of the fire suppression system) will be supplied by the KEC and installed by the Mechanical Contractor. In every case the valves will be electrically tripped, and manually reset. Electric or automatic reset valves are not permitted.

2.26 ITEMIZED EQUIPMENT

ITEM NO. 1 - FLOOR TROUGH EAGLE GROUP, MODEL: FT-2468-SG

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- ADA grate.

ITEM NO. 2 - WALK - IN COMPRESSOR RACK - BY OWNER

ITEM NO. 3 - PAN RACK W/ MOW TOTES CHANNEL, MODEL: 400S

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Casters with brakes.
- Capacity: (30) 18" x 26" sheet pans.
- Front loading.

ITEM NO. 4 - CHECK IN DESK - MILLWORK / BY GENERAL CONTRACTOR

ITEM NO. 5 - SPARE NUMBER

ITEM NO. 6 - HAND SINK

KROWNE, MODEL: HS-5

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel splashes on each side.
- Direct drain connection set.
- Splash mounted faucet.

ITEM NO. 7 - MOBILE WORKTABLE

EAGLE GROUP, MODEL: T2436SE-CA

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- All stainless steel construction.
- Stainless steel undershelf.
- (4) 5" dia. casters with brakes.
- Size and shape per plan.

ITEM NO. 8 - SANITIZER STATION W/ SPRAY

SPRAY MASTER TECHNOLOGIES, MODEL: 300-600W

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Hose Management: 200-RW hose reel
- Quick Coupler: at hose, spray gun and unit connections
- Thermal Limit: switch, 120°F
- Chemical Injection: dual chemical metering valves
- Anti-siphon & backflow protection / float tank.
- Water Level Float Switch.
- Pressure Gauge: 2000 psi / 138 bars, liquid filled
- Cover: stainless steel fully enclosed.
- - chemical baskets, each holds 1 bottle (1gal / 3.8L), spray gun hanger
- 4' / 1.3m, GFCI power cord
- Maintenance Kit:

ITEM NO. 9 - HOSE REEL WITH SPRAY- INCLUDED IN ITEM 8

ITEM NO. 10 - MOP RACK

EAGLE GROUP, MODEL: 312688

ITEM NO. 11 - HAND SINK

KROWNE, MODEL: HS-5

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel splashes on each side.
- Direct drain connection set.
- Splash mounted faucet.

ITEM NO. 12 - EVAPORATOR COIL - BY OWNER

ITEM NO. 13 - COOLER STORAGE SHELVING

EAGLE GROUP, MODEL: S4-63-2448E

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (4) 24" X 48" Epoxy coated shelves.
- (4) 63" high, Epoxy coated posts (stationary application).

ITEM NO. 14 - WALK-IN COOLER - BY OWNER

ITEM NO. 15 - SPARE NUMBER

ITEM NO. 16 - EVAPORATOR COIL - BY OWNER

ITEM NO. 17 - PAN RACK W/ MOW TOTES

CHANNEL, MODEL: 400S

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Casters with brakes.
- Capacity: (30) 18" x 26" sheet pans.
- Front loading.

ITEM NO. 18 - WALK-IN FREEZER - BY OWNER

ITEM NO. 19 - SPARE NUMBER

ITEM NO. 20 - SPARE NUMBER

ITEM NO. 21 - EVAPORATOR COIL - BY OWNER

ITEM NO. 22 - FREEZER STORAGE SHELVING

EAGLE GROUP, MODEL: S4-63-2448E

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (4) 24" X 48" Epoxy coated shelves.
- (4) 63" high, Epoxy coated posts (stationary application).

ITEM NO. 23 - DRY STORAGE SHELVING

EAGLE GROUP, MODEL: S4-74-2448E

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (4) 24" X 48" Epoxy coated shelves.
- (4) 74" high, Epoxy coated posts (stationary application).

ITEM NO. 24 - PAN RACK W/ MOW TOTES
CHANNEL, MODEL: 400S

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Casters with brakes.
- Capacity: (30) 18" x 26" sheet pans.
- Front loading.

ITEM NO. 25 - SPARE NUMBER

ITEM NO. 26 - SLICER
HOBART, MODEL: HS6-1

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Electric power.
- 13" Clean Cut knife.
- Removable ring guard cover.
- Zero knife exposure.
- Burnished aluminum base.
- Cord and plug.

ITEM NO. 27 - PREP TABLE W/ SINKS
EAGLE GROUP, MODEL: SMPT30120

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Size and shape per plan.
- (2) sink bowls with cutting board holders.
- (1) Faucet, Fisher, model: 97675
- (2) Drain valves, Fisher, model: 22209.
- Boxed backsplash.
- Cutting board holder.

ITEM NO. 28 - FOOD GRINDER
GLOBE, MODEL: CM22

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Knife.
- Stainless steel product tray.
- 1/4" plate.
- 5/16" plate.
- Stuffing tube.
- Plastic food pusher.
- Chopping knife.

ITEM NO. 29 - OVERSHELF

EAGLE GROUP, MODEL: 421505 MODIFIED

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Approximate size: 84" x 18".
- Location per plan.
- Shelf to be installed 18" above table working surface on the uprights welded to (2) backsplashes of item 27.

ITEM NO. 30 - WALL SHELF

EAGLE GROUP, MODEL: WS1248-14/3

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- All stainless steel construction.
- Location per plan.

ITEM NO. 31 - SPARE NUMBER

ITEM NO. 32 - FOOD PROCESSOR

WARING COMMERCIAL, MODEL: WFP11SW

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Standard accessory kit.

ITEM NO. 33 - WORK TABLE W/ DRAWER

EAGLE GROUP, MODEL: T3048SE-BS

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- All stainless steel construction.
- 6" boxed backsplash.
- Stainless steel undershelf.

ITEM NO. 34 - 60QT FLOOR MIXER

HOBART, MODEL: HL600-1STD

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Gear transmission.
- Four fixed speeds plus stir speed.
- Shift-on-the-fly controls.
- Soft Start agitation technology.
- 20-minute smarttimer.
- Single Point bowl installation.
- Ergonomic swing-out bowl.
- Power bowl lift.
- #12 taper attachment hub.
- Open base.
- Stainless steel bowl guard.
- 60 quart stainless steel bowl.

- 60 quart “B” beater.
- 60 quart “D” wire whip.
- 60 quart “ED” Dough Hook.

ITEM NO. 35 - MIXER UTENSIL RACK
EAGLE GROUP, MODEL: CUSTOM FABRICATION

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- 2” x ¼” stainless steel bar with hooks.
- Wall mounted above item 34 and one above 36.

ITEM NO. 36 - 20QT MIXER
BOBART, MODEL: HL200-1

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Gear transmission.
- Three fixed speeds plus stir speed.
- Shift-on-the-fly controls.
- Soft Start agitation technology.
- 15-minute smarttimer.
- Single Point bowl installation.
- Ergonomic swing-out bowl.
- #12 taper attachment hub.
- Open base.
- Stainless steel bowl guard.
- 20 quart stainless steel bowl.
- 20 quart “B” beater.
- 20 quart “D” wire whip.
- 20 quart “ED” Dough Hook.

ITEM NO. 37 - WALL SHELF
EAGLE GROUP, MODEL: WS12108-14/3

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel construction.

ITEM NO. 38 - TRASH RECEPTACLE - BY OWNER

ITEM NO. 39 - SPARE NUMBER

ITEM NO. 40 - SPARE NUMBER

ITEM NO. 41 - WORK TABLE W/ SINK
EAGLE GROUP, MODEL: T30108SE-BS MOD

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Size and shape per plan.

- (1) sink bowls with cutting board holders.
- (1) Faucet, Fisher, model: 97675
- (1) Drain valves, Fisher, model: 22209.
- Boxed backsplash.
- Cutting board holder.

ITEM NO. 42 - HAND SINK
KROWNE, MODEL: HS-5

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel splashes on each side.
- Direct drain connection set.
- Splash mounted faucet.

ITEM NO. 43 - HEATED CABINET
F.W.E. , MODEL: UHST-13D-HO

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Heavy-duty casters with brakes.
- Corner bumpers.

ITEM NO. 44 - WATER FILTER
RATIONAL, MODEL: COMBI DUO

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Item to serve item 46.

ITEM NO. 45 - SPARE NUMBER

ITEM NO. 46 - DOUBLE COMBI OVEN
RATIONAL, MODEL: iCombi Pro/6-2/1 G on iCombi Pro 6-2/1 G

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (2) stacked ovens.
- Natural gas operation.
- Gas pressure regulator.
- Backflow preventer.
- Restraint device.
- Low profile casters with brakes.
- Intelligent cooking system.
- WI-FI enabled.
- Combi duo stacking kit: for 6 on 6 oven.

ITEM NO. 47 - 40 GAL TILT SKILLET
CLEVELAND RANGE, MODEL: SGL-40-TR

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Double pantry faucet.

- Draw-off.
- Assisted spring cover.
- Manual lift.
- Gas pressure regulator.
- Natural gas operation.

ITEM NO. 48 - FLOOR TROUGH
EAGLE GROUP, MODEL: ASFT-2484-SG

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- ADA grate.

ITEM NO. 49 - SPARE NUMBER

ITEM NO. 50 - SPARE NUMBER

ITEM NO. 51 - 40 GAL. KETTLE
CLEVELAND RANGE, MODEL: KGL-40-TSH

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Double pantry faucet.
- Natural gas operation.
- Gas pressure regulator.
- Draw-off.
- Spring assisted cover.

ITEM NO. 52 - FLOOR TROUGH
EAGLE GROUP, MODEL: ASFT-2436-SG

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- ADA grate.

ITEM NO. 53 - EXHAUST HOOD
ACCUREX, MODEL: XXEW-103.5-S

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Kitchen Ventilation hood(s) shall be of the Type I, exhaust only wall canopy suitable for all types of cooking applications. The hood(s) shall be U.L. 710 Listed without a fire damper (with optional) for medium, heavy, or extra-heavy duty rated cooking appliances. Please visit www.ul.com for U.L. 710 listing for performance and size options.
- Make-up air shall be independently provided.
- The hood(s) exterior shall be constructed of a minimum of 18 gauge 300 series stainless steel.
- The hood(s) shall be constructed using the standing seam method for optimum strength and with a Performance Enhancing Lip (PEL) to improve capture efficiency by turning air back into the hood.
- All seams, joints and penetrations of the hood enclosure shall be welded and/or liquid tight. Lighter material gauges, alternate material types and finishes are not acceptable.

- All unexposed interior surfaces shall be constructed of a minimum 18-gauge corrosion resistant steel including, but not limited to ducts, plenum, and brackets.
- The hood(s) shall include a filter housing constructed of the same material as the hood. The Grease-X-Tractor high efficiency stainless steel filters shall be U.L. 1046 Classified and NSF Certified as manufactured by Accurex, in sufficient number and size to ensure optimum performance. Grease-X-Tractor filters shall direct the exhaust airflow through individual cyclone chambers, utilizing centrifugal impingement grease extraction technology.
- The filter housing shall terminate in a pitched, full length grease trough which shall drain into a removable grease container. These filters shall have a grease removal efficiency of 69% at 8 microns (51% from 3-10 microns) and static pressure drop of 0.7-0.8 in WC.
- Vapor proof, U.L. Listed incandescent (LED optional, restrictions apply) light fixtures shall be pre-wired to a junction box located at the top of the hood for field connection. Wiring shall conform to the requirements of the NFPA® 70.
- The canopy hood(s) shall be constructed by Accurex. They shall be built in accordance with the NFPA® 96, IMC, UMC, and bear the NSF Seal of Approval. The hood manufacturer shall provide, on request, the necessary data that confirms compliance with the code authorities listed above.
- Lights and fan to be pre-wired to control panel installed in hood canopy.

ITEM NO. 54 - FIRE SUPPRESSION SYSTEM

ANSUL, MODEL: R-102

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- The System shall be UL 300 Listed, installed per the Manufacturer's listing, and be capable of automatic and/or manual activation. Automatic activation shall be provided by fusible link detectors and/or a connection with another fire and/or alarm system. Manual activation shall be provided by manual pull station(s).
- Manual pull station(s) to be recessed in the wall whenever possible, installed per the location shown on the drawings at a height between 42" and 48 "above the finished floor.
- Provide system design and drawings for approval prior to installation of the system.
- Exhaust hood manufacturer to provide all exhaust hood penetrations, listed seals and piping in the hood. No exceptions.
- Stainless steel cabinet.
- All exposed piping shall be stainless steel, chrome plated or sleeved. Run unexposed piping wherever possible. Horizontal piping within the canopy is not acceptable.
- Provide all appliance, duct and plenum protection nozzles.
- Provide (1) each single pole double throw mechanically actuated electrical switch with dry contact points rated at 28 VDC, 50 mA to be used to facilitate the connection to:
- Life Safety Alarm System signaling upon system actuation.
- Provide (3) each single pole double throw mechanically actuated electrical switch with dry contact points rated at 250 VAC, 21A to be used to facilitate the connection to:
- Shunt all electrical power in the hazard area upon system actuation.

- Shunt all electrical power to the makeup air fan and compensating air fan (if applicable) upon system actuation.
- Shunt all electrical power to the electrical gas valve if applicable upon system actuation.
- Provide manual gas shut off valve and reset relay to shunt the gas supply in the hazard area upon system activation. Verify the size and location of the valve with Division 22 Plumbing. Division 22 Plumbing to install the gas valve.
- Provide Y Strainer(s) with 40 mesh stainless steel screen, (for the protection of the gas shut off valve(s)), on the inlet side, as close to the valve as possible. See General Conditions Y Strainer for more detail.
- Provide field distribution piping, field installed conduit, supports, and A-PC style fusible links. All field piping shall be installed by a certified and licensed contractor.
- Provide Class K fire extinguisher(s).
- Provide kitchen with durable plastic signage at each manual pull station and on each exhaust hood that identifies the associated manual pull station(s) with associated exhaust hood(s).
- Provide a full system test in the presence of the Authority Having jurisdiction (AHJ). Upon successful completion of such test and authorization from the AHJ, arm and tag the system as compliant and approved for use.

ITEM NO. 55 - SPARE NUMBER

ITEM NO. 56 - FIRE SUPPRESSION SYSTEM

ANSUL, MODEL: R-102

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- The System shall be UL 300 Listed, installed per the Manufacturer's listing, and be capable of automatic and/or manual activation. Automatic activation shall be provided by fusible link detectors and/or a connection with another fire and/or alarm system. Manual activation shall be provided by manual pull station(s).
- Manual pull station(s) to be recessed in the wall whenever possible, installed per the location shown on the drawings at a height between 42" and 48 "above the finished floor.
- Provide system design and drawings for approval prior to installation of the system.
- Exhaust hood manufacturer to provide all exhaust hood penetrations, listed seals and piping in the hood. No exceptions.
- Stainless steel cabinet.
- All exposed piping shall be stainless steel, chrome plated or sleeved. Run unexposed piping wherever possible. Horizontal piping within the canopy is not acceptable.
- Provide all appliance, duct and plenum protection nozzles.
- Provide (1) each single pole double throw mechanically actuated electrical switch with dry contact points rated at 28 VDC, 50 mA to be used to facilitate the connection to:
 - Life Safety Alarm System signaling upon system actuation.
- Provide (3) each single pole double throw mechanically actuated electrical switch with dry contact points rated at 250 VAC, 21A to be used to facilitate the connection to:
 - Shunt all electrical power in the hazard area upon system actuation.
 - Shunt all electrical power to the makeup air fan and compensating air fan (if applicable) upon system actuation.
 - Shunt all electrical power to the electrical gas valve if applicable upon system actuation.

- Provide manual gas shut off valve and reset relay to shunt the gas supply in the hazard area upon system activation. Verify the size and location of the valve with Division 22 Plumbing. Division 22 Plumbing to install the gas valve.
- Provide Y Strainer(s) with 40 mesh stainless steel screen, (for the protection of the gas shut off valve(s)), on the inlet side, as close to the valve as possible. See General Conditions Y Strainer for more detail.
- Provide field distribution piping, field installed conduit, supports, and A-PC style fusible links. All field piping shall be installed by a certified and licensed contractor.
- Provide Class K fire extinguisher(s).
- Provide kitchen with durable plastic signage at each manual pull station and on each exhaust hood that identifies the associated manual pull station(s) with associated exhaust hood(s).
- Provide a full system test in the presence of the Authority Having jurisdiction (AHJ). Upon successful completion of such test and authorization from the AHJ, arm and tag the system as compliant and approved for use.

ITEM NO. 57 - SPARE NUMBER

ITEM NO. 58 - EXHAUST HOOD ACCUREX, MODEL: XXEW-103.5-S

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Kitchen Ventilation hood(s) shall be of the Type I, exhaust only wall canopy suitable for all types of cooking applications. The hood(s) shall be U.L. 710 Listed without a fire damper (with optional) for medium, heavy, or extra-heavy duty rated cooking appliances. Please visit www.ul.com for U.L. 710 listing for performance and size options.
- Make-up air shall be independently provided.
- The hood(s) exterior shall be constructed of a minimum of 18 gauge 300 series stainless steel.
- The hood(s) shall be constructed using the standing seam method for optimum strength and with a Performance Enhancing Lip (PEL) to improve capture efficiency by turning air back into the hood.
- All seams, joints and penetrations of the hood enclosure shall be welded and/or liquid tight. Lighter material gauges, alternate material types and finishes are not acceptable.
- All unexposed interior surfaces shall be constructed of a minimum 18-gauge corrosion resistant steel including, but not limited to ducts, plenum, and brackets.
- The hood(s) shall include a filter housing constructed of the same material as the hood. The Grease-X-Tractor high efficiency stainless steel filters shall be U.L. 1046 Classified and NSF Certified as manufactured by Accurex, in sufficient number and size to ensure optimum performance. Grease-X-Tractor filters shall direct the exhaust airflow through individual cyclone chambers, utilizing centrifugal impingement grease extraction technology.
- The filter housing shall terminate in a pitched, full length grease trough which shall drain into a removable grease container. These filters shall have a grease removal efficiency of 69% at 8 microns (51% from 3-10 microns) and static pressure drop of 0.7-0.8 in WC.

- Vapor proof, U.L. Listed incandescent (LED optional, restrictions apply) light fixtures shall be pre-wired to a junction box located at the top of the hood for field connection. Wiring shall conform to the requirements of the NFPA® 70.
- The canopy hood(s) shall be constructed by Accurex. They shall be built in accordance with the NFPA® 96, IMC, UMC, and bear the NSF Seal of Approval. The hood manufacturer shall provide, on request, the necessary data that confirms compliance with the code authorities listed above.
- Lights and fan to be pre-wired to control panel installed in hood canopy

ITEM NO. 59 - SPARE NUMBER

ITEM NO. 60 - SPARE NUMBER

ITEM NO. 61 - 4 BURNER RANGE

SOUTHBEND, MODEL: P24C-BB

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Cabinet base.
- Casters with brakes.
- Natural gas operation.
- Restraint device.
- Gas pressure regulator.
- Flexible gas connector.

ITEM NO. 62 - DOUBLE CONVECTION OVEN

BLODGETT MODEL: DFG100 DOUBLE

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Natural gas operation.
- Gas pressure regulator.
- Casters with brakes.
- Flexible gas connector.

ITEM NO. 63 - DOUBLE CONVECTION OVEN

BLODGETT, MODEL: DFG100 DOUBLE

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Natural gas operation.
- Gas pressure regulator.
- Casters with brakes.
- Flexible gas connector.

ITEM NO. 64 - HEATED CABINET

F.W.E. , MODEL: UHST-13D-HO

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Heavy-duty casters with brakes.

- Corner bumpers.

ITEM NO. 65 - SPARE NUMBER

ITEM NO. 66 - PACKAGING MACHINE- EXISTING

ITEM NO. 67 - WORK TABLE

EAGLE GROUP, MODEL: T3696SE-CA MOD

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Size and location per plan.
- All stainless steel construction.
- Provisions for items 68.
- 12” aprons on all (4) sides.
- Flanged feet.

ITEM NO. 68 - HOT FOOD WELL

WELLS, MODEL: MOD-300TDM/AF

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Autofill.
- Control panel built into the apron of item 67.

ITEM NO. 69 - SPARE NUMBER

ITEM NO. 70 - SPARE NUMBER

ITEM NO. 71 - MOP SINK STORAGE CABINET

EAGLE GROUP, MODEL: F1916-VSCS

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Mop sink.
- Utility faucet, Fisher, model: 72714.

ITEM NO. 72 - DRY STORAGE SHELVING

EAGLE GROUP, MODEL: S4-74-2448E

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (4) 24” X 48” Epoxy coated shelves.
- (4) 74” high, Epoxy coated posts (stationary application).

ITEM NO. 73 - SPARE NUMBER

ITEM NO. 74 - SOILED DISHTABLE

EAGLE GROUP, MODEL: SDTL-72-14/3

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Size and shape per plan.

- Provision for item 77.
- Base open to accept item 76.
- Transition to item 82.
- Boxed backsplash.

ITEM NO. 75 - SPARE NUMBER

ITEM NO. 76 - TRASH RECEPTACLE - BY OWNER

ITEM NO. 77 - DISPOSER

IN-SINK-ERATOR, MODEL: SS-200-12A-AS101

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Item dropped into item 74.
- On/off switch.

ITEM NO. 78 - PRE-RINSE FAUCET

FISHER, MODEL: 34436

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Wall bracket.

ITEM NO. 79 - SPARE NUMBER

ITEM NO. 80 - SPARE NUMBER

ITEM NO. 81 - VENT-LOAD END

EAGLE GROUP, MODEL: DVS-72

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel construction.
- Coordinate connection with item 82.

ITEM NO. 82 - WAREWASHER W/ BOOSTER HEATER

JACKSON, MODEL: AJ-44CGP-LP

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Water tempering kit.
- Direct vents, one on each end.
- Booster heater.
- Connected to items 74 and 84.

ITEM NO. 83 - VENT-UNLOAD END

EAGLE GROUP, MODEL: DVS-72

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel construction.
- Coordinate connection with item 82.

ITEM NO. 84 - DISHTABLE W/ 3 COMPARTMENT SINK

EAGLE GROUP, MODEL: SDTL-108-14/3 MOD

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Size and shape per plan.
- All stainless steel construction.
- Three compartment sink section with:
 - (1) faucet: Fisher, model: 97675
 - (3) drain valves: 22209.
- Boxed backsplash.
- Flanged feet.

ITEM NO. 85 - SPARE NUMBER

ITEM NO. 86 - RACK SHELF

EAGLE GROUP, MODEL: 60643

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Location and size per plan.

ITEM NO. 87 - POT AND PAN SHELVING

METRO, MODEL: PR48VX4-XDR

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- (4) Tier (24" X 48") racks with drip tray.
- Metromax shelving.
- 68" high.
- (4) casters with brakes.
- The drying rack includes 2 cutting board/tray rack, 2 steam pan racks and 1 adjustable drip tray.
- Capacity: 200 lbs.

ITEM NO. 88 - SPARE NUMBER

ITEM NO. 89 - SPARE NUMBER

ITEM NO. 90 - SPARE NUMBER

ITEM NO.91 - HAND SINK

KROWNE, MODEL: HS-5

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- Stainless steel splashes on each side.
- Direct drain connection set.
- Splash mounted faucet.

ITEM NO.92 - THREE COMPARTMENT SINK

EAGLE GROUP, MODEL: 414-18-3-30

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- All stainless steel construction.
- (1) faucet: Fisher, model: 97675
- (3) drain valves: 22209.
- Boxed backsplash.
- Flanged feet.

ITEM NO.93 - THREE COMPARTMENT SINK

EAGLE GROUP, MODEL: 414-18-3-30

Components: Item to be complete with all standard factory options and accessories, including the following modifications:

- All stainless steel construction.
- (1) faucet: Fisher, model: 97675
- (3) drain valves: 22209.
- Boxed backsplash.
- Flanged feet.

ITEM NO. 94-100 - SPARE NUMBER

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install foodservice equipment level and plumb, according to manufacturer's written instructions.
1. Connect equipment to utilities.
 2. Retain subparagraph below if equipment items will be modified on-site.
 3. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections. No cutting, notching, drilling, or altering of any kind will be done to the building by any Kitchen Equipment Contractor without first obtaining permission from the General Contractor.
 4. Do all cutting and fitting required on the equipment during installation and hook up. Should any repairs to food service equipment be required due to neglect of other contractors, all extra charges are to be approved and all repairs are to be noted in writing before work is performed, stipulating the price and to whom the extra expense is to be paid. In case the Contractor does not secure such extra order, the expense will be borne by him.
- B. Complete equipment assembly where field assembly is required.
1. Provide closed butt and contact joints that do not require a filler.
 2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish.
 3. Ends of hollow sections shall be closed

- C. Install equipment with access and maintenance clearances that comply with manufacturer's written installation instructions and requirements of authorities having jurisdiction.
- D. Kitchen Equipment Contractor will verify all building conditions and coordinate with the General Contractor proper access of large equipment to the building prior to close of bidding. Costs for any specific items or equipment required for the movement of large, heavy or bulky equipment including rigging, cartage, etc. is solely the responsibility of the Kitchen Equipment Contractor
- E. Install cabinets and similar equipment on concrete or masonry bases in a bed of sealant as applicable.
- F. Install closure-trim strips and similar items requiring fasteners in a bed of sealant.
- G. Install joint sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Produce airtight, watertight, vermin-proof, sanitary joints.
- H. Beverage system line runs of any kind and at any configuration, size, or length will be required to run through an authorized conduit system properly planned and executed through coordination with the appropriate divisions.
 - 1. The conduit system shall be furnished and installed by the electrical division if routed overhead in strict coordination with and through direction from the appropriate design team members and project participants be they the beverage system provider, the soft drink purveyor or others as assigned, the owner and operators of the facility. Beverage system for-construction drawings and specifications will be generated by the electrical division with approval required by the selected beverage system provider, soda system provider, and assigned project engineers prior to commencement of construction. An authorized conduit system shall consist of 4", 6", 8" or 10" diameter (as required) corrosion-resistant aluminum tubing, conforming to ASTM-B313 and ANSI-H26 and H35.1. Conduit bends shall be long sweep type, of the same grade and coated in the same manner as the conduit lines. Minimum centerline radius of all bends shall be 24" for 4" O.D., 30" for 6" O.D., 32" for 8" O.D. and 32 for 10" O.D. No segmented elbows or short radius plumbing elbows shall be permitted. All joints shall be made with a liquid-tight mechanical bolted coupling system or liquid-tight slip coupling system. Edges of tubing and bends must be de-burred and smoothed prior to forming joints. Expansion sleeves with a moisture barrier must be provided where the conduit crosses building expansion joints, liquid-tight integrity maintained

3.2 CLEANING AND PROTECTING

- A. After completing installation of equipment, repair damaged finishes.
- B. Clean and adjust equipment as required to produce ready-for-use condition.
- C. Protect equipment from damage during remainder of the construction period.

1. Contractor will be responsible during the progress of the work to protect equipment against theft and/or damage until final acceptance by the Owner. All items delivered to the job site prior to final acceptance shall be signed for, as delivered, by the Contractor. Responsibility for safekeeping will rest with the Contractor in coordination with the Contractor's requirements.
2. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment, are not to be used for general storage by other trades and shall be locked by this contractor before leaving the site. It is the Contractor's responsibility to insure proper ventilation is provided during the cleaning and curing of masonry wearing floors inside the walk-in boxes. Damage and/or theft resulting from failure to secure boxes will be repaired/replaced at Kitchen Equipment Contractor's expense.

3.3 DEMONSTRATION

- A. Provide factory-trained engineers for start-up and demonstration of equipment. Demonstration shall be done in two stages: one for operation and the second to maintenance personnel, Refer to Division 01 for additional requirements.
- B. Return to the job site within ten (10) days after the demonstration for final adjustment and calibration of equipment.
- C. The Kitchen Equipment Contractor shall provide a trained and qualified Service Agency facility and personnel to be available within 24 hours after request by an authorized representative of the Owner to repair or replace defective equipment (as specified in section 11400) for the Warranty period without cost to the Owner's representative, including all costs such as labor, materials, parts, travel, travel time, lodging, out of pocket expenses, and other expenses, unless such service is required because of misuse, negligence, willful damage, improper maintenance or accident by other parties. Refer to other sections for further information regarding Warranty requirements

END OF SECTION 114000

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SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.
2. Fixed shades.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Basis-of-Design product Mechoshade or comparable product by one of the following:
 - 1. Draper, Inc.
 - 2. Hunter Douglas Contract
 - 3. Lutron Electronics Co., Inc.
 - 4. Nysan Solar Control Inc., Hunter Douglas Company.
 - 5. Lutek Inc. Shading Systems
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Chain-Retainer Type: Chain tensioner, jamb mounted.
 - 2. Spring Lift-Assist Mechanisms: Provide for shadebands that weigh more than 10 lb (4.5 kg) or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of interior face of shade.
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
 - 1. Shadeband Material: Light-filtering fabric.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
- G. Installation Accessories:
 - 1. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - 2. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 FIXED SHADES

- A. Basis-of-Design product Mechoshade Fixed Shades or comparable product by one of the following:
 - 1. Draper, Inc.
 - 2. Hunter Douglas Contract

3. Lutron Electronics Co., Inc.
4. Nysan Solar Control Inc., Hunter Douglas Company.
5. Lutek Inc. Shading Systems

B. Mounting Hardware: Manufacturer's standard for an inside mount.

C. Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.

2.4 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

1. Source: Roller shade manufacturer, Basis-of-design ThermoVeil Dense Vertical Weave 1000 Series or equivalent.
2. Type: PVC-coated polyester.
3. Weave: Lineally Woven.
4. Roll Width: 63 and 96 inches.
5. Orientation on Shadeband: Up the bolt.
6. Openness Factor: 2-3 percent.
7. Color: 1004 Black / Brown.

2.5 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible.

PART 3 - EXECUTION

3.1 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- D. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- E. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

SECTION 12 3661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-surface-material countertops and backsplashes.
 - 2. Solid-surface-material window sills.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: Straight, slightly eased at top.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. Endsplash: Matching backsplash.
- B. Countertops: 12.7-mm- (1/2-inch-) thick, solid surface material with front edge built up with same material.
- C. Backsplashes: 12.7-mm- (1/2-inch-) thick, solid surface material.
- D. Window sills: 12.7-mm- (1/2-inch-) thick, solid surface material.

2.2 MATERIALS

- A. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- C. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- D. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
1. Manufacturers: Subject to compliance with requirements, provide products by:
 - a. Basis-of-Design: E. I. du Pont de Nemours and Company or architect approved equivalent. Equivalent manufacturers include, but are not limited to:
 - 1) Avonite
 - 2) Formica
 - 3) Wilsonart
 - 4) LG HI-Macs
 - 5) Samsung Staron
 - 6) Swanstone
 - 7) Hanex
 - 8)
 2. Type: Provide Standard Type unless Special Purpose Type is indicated.
 3. Colors and Patterns: As scheduled on drawings.
- E. Accessories:
1. Trash Grommet: Refer to Toilet and Bath Accessories Specification Section 10 2800.
 2. Low Profile Countertop Bracket at Lavatory or front approach sink or 24 to 26 inch depth countertops: Basis-of-Design Hafele Hebgo Bracket Item No 287.45.468 or equal. Overall size 480mm x 80mm x 180mm. Support up to 1100 per pair. Color Gray primed steel, paint as noted in drawings. Provide 2 brackets at each sink, one on each side of the sink.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

END OF SECTION 12 3661

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Metal soffit panels.
5. Thermal insulation.
6. Accessories.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of metal building system component.
- B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and attachments to other work.
1. Insulation and vapor-retarder systems: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.
- C. Samples: For units with factory-applied finishes.
- D. Delegated-Design Submittal: For metal building systems.
1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
1. Name and location of Project.
 2. Order number.

3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

- C. Material test reports.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.
 1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
 2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.
- B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.7 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 35 years from date of Substantial Completion.
- B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Nucor Building Systems.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal building system.
- B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
 - 1. Design Loads: As indicated on Drawings.
 - 2. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.

- E. Air Infiltration for Metal Roof Panels: Air leakage of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** when tested according to ASTM E1680 or ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa)**.
- F. Air Infiltration for Metal Wall Panels: Air leakage of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** when tested according to ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa)**.
- G. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **2.86 lbf/sq. ft. (137 Pa)**.
- H. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **2.86 lbf/sq. ft. (137 Pa)**.

2.3 STRUCTURAL-STEEL FRAMING

- A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."
- B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters and rake beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - 2. Frame Configuration: Single gable.
 - 3. Exterior Column: Tapered.
 - 4. Rafter: Tapered.
- E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
- F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:

- G. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

2.4 METAL ROOF PANELS

- A. Standing-Seam, Trapezoidal-Rib, Metal Roof Panels: Formed with interlocking ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
1. Basis-of-Design Product: Nucor CFR.
 2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.024-inch (24 gage)** nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Exterior Finish: Two-coat fluoropolymer.
 - b. Color: As selected by Architect from manufacturer's full range.
 3. Clips: One-piece fixed to accommodate thermal movement.
 4. Joint Type: Panels snapped together.
 5. Panel Coverage: **24 inches (610 mm)**.
 6. Panel Height: **3 inches (76 mm)**.

2.5 METAL WALL PANELS

- A. Exposed-Fastener, Tapered-Rib, Metal Wall Panels Insert drawing designation: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
1. Basis-of-Design Product: Nucor Classic Wall.
 2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.018-inch (26 guage)** nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Exterior Finish: Two-coat fluoropolymer.
 - b. Color: As selected by Architect from manufacturer's full range.
 3. Major-Rib Spacing: **12 inches (305 mm)** o.c.
 4. Panel Coverage: **36 inches (914 mm)**.
 5. Panel Height: **1.25 inches (32 mm)**.

2.6 METAL SOFFIT PANELS

- A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to

supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

- B. Metal Soffit Panels: Match profile and material of metal wall panels.
 - 1. Finish: As selected by Architect from manufacturer's full range.
- C. Location: At underside of pre-engineered metal building canopies exposed to the exterior. Soffit panels at wood-framed areas of the building are specified in section 074293 Soffit Panels.

2.7 THERMAL INSULATION

- A. Basis-of-Design for system design of insulation, retainers, vapor barrier and accessories: Simple Saver System by Thermal Design.
- B. Unfaced Metal Building Insulation: ASTM C991, Type I, or NAIMA 202, glass-fiber-blanket insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density; with a flame-spread index of 25 or less.
 - 1. Basis-of-Design Product: Owens-Corning Ecotouch Certified R Metal Building Insulation.
 - 2. Size: Equal to purlin/girt spacing by manufacturer's standard lengths. Thicknesses as required to fill girt spaces and shown on drawings and to meet indicated R-values.
 - 3. Wall Insulation Hangers: Fast-R preformed rigid hangers, or equal, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length
- C. Retainer Straps: For securing vapor-retarder and insulation between supports, and to serve as fall protection at roof, High-tensile-strength stainless steel coated with woven polyester plastic to match insulation facing.
 - 1. Basis-of-Design: UVMAX Strapping by Thermal Design.
 - 2. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
 - 3. Galvanized, primed, and painted to match specified vapor-retarder finish color on the exposed side.
- D. Vapor-Retarder: ASTM C1136, with permeance not greater than 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E96/E96M, Desiccant Method.
 - 1. Basis-of-Design Product: Syseal Fabric by Thermal Design.
 - 2. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
 - 3. Provide with factory double, extrusion welded seams.
 - 4. Tape and sealant: Provide manufacturer's recommended lap sealant and double-sided seam tape.

5. Color: White

- E. Thermal Breaks: 1/8 inch (3 mm) thick by 3 inch (76 mm) wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing for thermally isolating exterior metal panels from metal building wall girts.

2.8 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
- D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.018-inch (0.46-mm)** nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
- E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.018-inch (0.46-mm)** nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum **96-inch- (2438-mm-)** long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters.
 2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.
- F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.018-inch (0.46-mm)** nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum **10-foot- (3-m-)** long sections, complete with formed elbows and offsets.
1. Mounting Straps: Fabricated from same material and finish as gutters.
- G. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.048-inch (1.21-mm)** nominal uncoated steel thickness prepainted with coil coating; finished to match

metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.

- H. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.9 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
- D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
- E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.10 SOURCE QUALITY CONTROL

- A. Special Inspection: General Contractor will engage a qualified special inspector to perform source quality control inspections and to submit reports.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written instructions and drawings.

- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
 - 1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
 - a. Joint Type: Snug tightened or pretensioned as required by manufacturer.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
 - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 - 2. Locate and space wall girts to suit openings such as doors and windows.
 - 3. Provide supplemental framing at entire perimeter of openings, including doors, windows, ventilators, and other penetrations of roof and walls.
- H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
 - 1. Tighten rod and cable bracing to avoid sag.
 - 2. Locate interior end-bay bracing only where indicated.

- I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.2 METAL PANEL INSTALLATION, GENERAL

- A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
 - 2. Install metal panels perpendicular to structural supports unless otherwise indicated.
 - 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Locate metal panel splices over structural supports with end laps in alignment.
 - 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- B. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
 - 1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
 - 1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.3 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
1. Install ridge and hip caps as metal roof panel work proceeds.
 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
1. Install clips to supports with self-drilling or self-tapping fasteners.
 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 4. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
 5. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Pre-drill panels for fasteners.
 6. Provide metal closures at peaks rake edges rake walls and each side of ridge and hip caps.
- C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.4 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 2. Shim or otherwise plumb substrates receiving metal wall panels.
 3. When two rows of metal panels are required, lap panels **4 inches (102 mm)** minimum.
 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
 5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Pre-drill panels.
 6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 7. Install screw fasteners in predrilled holes.
 8. Install flashing and trim as metal wall panel work proceeds.
 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.

10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

3.5 METAL SOFFIT PANEL INSTALLATION

- A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.
- B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.6 ROOF INSULATION INSTALLATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions. Install blankets straight and true in one-piece lengths.
- B. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
- C. Straps:
1. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
 2. Tension straps to required value.
- D. Vapor Barrier Fabric:
1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
 2. Position pre-folded fabric on the strap platform along one eave purlin.
 3. Clamp the two bottom corners at the eave and also centered on the bay.
 4. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins.
 5. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
 6. Trim edges and seal along the rafters.
 7. All seams must be completely sealed and stapled seams not acceptable.
- E. Insulation:

1. Unpack, and shake to a thickness exceeding the specified thickness.
 2. Ensure that cavities are filled completely with insulation.
 3. Place on the vapor barrier liner fabric without voids or gaps.
 4. Place top layer of insulation over and perpendicular to the purlins without voids or gaps, as roof sheathing is applied.
 5. Place thermal block on top of purlins or bottom of purlins for retrofit work, if no other thermal break exists.
 6. Place new insulation between purlins at the required thickness for the R-value specified.
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- F. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

3.7 WALL INSULATION INSTALLATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions. Install blankets straight and true in one-piece lengths.
- B. Insulation:
1. Install thermal break to exterior surface of girts as wall sheathing is applied.
 2. Position and secure Fast-R hangers to girts on the inside face of the wall sheathing.
 3. Cut insulation to required lengths to fit vertically between girts.
 4. Fluff the insulation to the full-specified thickness.
 5. Neatly position in place and secure to Fast-R hangers.
 6. Ensure that cavities are filled completely with insulation.
- C. Vapor Barrier Fabric:
1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
 2. Apply the vapor barrier fabric by clamping it in position over eave strap and installing fasteners through the eave strap into each roof strap, permanently clamping the wall fabric between them.
 3. Once in position, draw the vapor barrier fabric down over the column flanges to the base angle and install vertical straps along each column and 5 feet 0 inches on center, maximum, fastening to each girt to retain system permanently in place.

4. All seams must be completely sealed and stapled seams not acceptable.
- D. Seal wall fabric to the roof fabric, to the base angle and up the columns to provide a continuous vapor barrier.

3.8 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet (3 m)** with no joints allowed within **24 inches (600 mm)** of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than **36 inches (914 mm)** o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- D. Downspouts: Join sections with **1-1/2-inch (38-mm)** telescoping joints. Provide fasteners designed to hold downspouts securely **1 inch (25 mm)** away from walls; locate fasteners at top and bottom and at approximately **60 inches (1524 mm)** o.c. in between.
1. Tie downspouts to underground drainage system indicated.
- E. Circular Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Mount ventilators on flat level base. Install preformed filler strips at base to seal ventilator to metal roof panels.

- F. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to metal roof panels.
- G. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: General Contractor will engage a qualified special inspector to perform field quality control special inspections and to submit reports.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 133419

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