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ARCHITECTURE

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# HARRIS COUNTY 1001 PRESTON
# 1ST FLOOR WINDOW RENOVATION

2015198-002

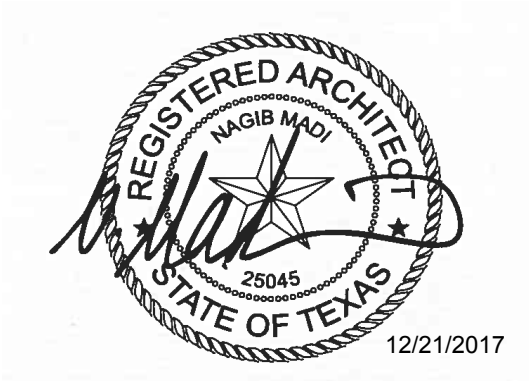
21 Dec 2017

ISSUED FOR BIDDING AND CONSTRUCTION

**DOCUMENT 000110 - TABLE OF CONTENTS**

**DOCUMENT 000107.1 - ARCHITECT SEAL PAGE**

All sections identified on the Table of Contents with a suffix of (A) have been furnished by the Architect for this Project:




**KIRKSEY**

**SECTION 010100 - SUMMARY OF WORK**

**PART 1 - GENERAL REQUIREMENTS**

1.01 DESCRIPTION OF WORK:

A. The purpose of this Contract is for the Contractor to furnish all labor, equipment, materials, and incidentals necessary to *REMOVE EXISTING WINDOW WALL AND DOORS SYSTEM AND REINSTALL A NEW SYSTEM AS WELL AS NEW STAIR ENCLOSURE AND* VESTIBULES, all complete, operational and in place in accordance with the drawings and specifications.

B. In the event of conflicts within the construction documents not clarified by addendum, the Contractor shall provide the better quality or greater quantity of work.

C. On projects with contract price of more than $25,000.00, the Contractor shall provide a construction schedule. The construction schedule will be a bar-type schedule and shall be of sufficient detail to show construction sequence for different items of work. On projects with a contract price of $5,000,000.00 or more, the Contractor shall submit a critical path method (CPM) type schedule showing the sequence of installation for the various components of the work. The construction schedule shall be updated by the Contractor whenever the schedule is impacted.

D. Schedule of Values:

1. The schedule of values may contain separate pay items for Division 1 requirements on bonding and insurance. All other costs shall be prorated across each line item of work.

2. On projects over $500,000.00 the schedule of values shall be divided into labor and material for each line item of work.

E. Permits

The Contractor shall obtain and pay for all construction-related permits, utility taps, and hook-ups. No additional compensation will be made for time associated with the permit process.

F. A full time designated field superintendent with a minimum of eight (8) years experience in similar construction types must be present at all times that work is in progress, and must be capable of making decisions on the Contractor's behalf. If the field superintendent is absent for any part of any day that work is being performed, then $150.00 per day (for each such occurrence) will be back charged to the Contractor and deducted from the estimate. Repetitive occurrences could be grounds for notifying the bonding company.

G. The Contractor must submit a list of all subcontractors prior to commencing work. During the course of this project, the Architect must be notified of any changes in subcontractors.

H. On projects that require a field office, the Contractor shall have the office complete in place and fully furnished and operational within 45 calendar days from the signing of the purchase order. Failure to have a fully furnished and operational field office within the allotted 45 calendar days will result in liquidated damages being assessed against the contract in the amount of fifty dollars ($50.00) per day for each day that the field office is not fully operational. The term fully operational shall include but not be limited to: all required utility connections, required furnishings and climate control.

I. Architect shall review test report for fire alarm and security systems prior to substantial completion.

**PART 2 - PROSECUTION OF THE PROJECT**

2.01 TASKS

A. Temporary Facilities - In addition to field offices required in Division 1 of these specifications, the following shall be provided:

1. Drinking Water
2. Toilet(s)

B. Parking:

1. The Contractor shall be responsible for the parking of his vehicles in a legal manner at no additional expense or inconvenience to Harris County.

C. Storage:

1. General - The Contractor shall be fully responsible for the security and safe keeping of any stored materials.

2. In addition to manufacturer's recommendations, deliver, store, and handle products using materials, means, and methods that shall prevent mildew and mold growth.

3. The Contractor may use proximate open areas of the site for storage of materials at his own risk. Storage areas must be approved by the Architect.

4. The Contractor may not use any existing part of any existing Harris County building for storage of materials unless approved in writing to do so by the Architect.

5. Remote - The Contractor may use a location "on" or "off" the job site for storage of materials. However, if he intends to submit requests for payment for stored materials, then Harris County, at its discretion, may pay for actual cost of material stored (less stipulated retainage) under the following conditions:

   a. The Contractor shall apply for and receive advanced written approval from the Architect.

   b. The intended location must be judged suitable and secure by the Architect.

   c. The storage shall be in a bonded warehouse, in Harris County's name, fully insured.

   d. The Contractor shall pay all costs related to the storage including loading, unloading, transportation, warehouse rent, and insurance.

   e. The quantity and quality of material shall be inspected by the Architect, to ascertain compliance with the Contract Documents, paid invoices, and materials list.

D. Hours of Work:

1. The building/site will be occupied by Harris County during the course of the project. The following is a suggested sequence of work by location: *COORDINATE WITH HARRIS COUNTY PM*.

2. The Contractor shall limit all construction activity to the following times: 7:00 a.m. to 4:00 p.m., Monday through Friday.

3. If it becomes necessary to work on weekends, holidays, and after the hours noted above, a written request to work shall be submitted for approval to the Manager of Architectural Construction Section, twenty-four (24) hours prior to performing the work. Access to the site during these hours shall be coordinated through the Chief Inspector.

4. Work shall be performed so as to not interfere with normal activities occurring outside the work area.

5. RAIN DAYS

   a. Building Projects – If inclement weather (as defined in the General Conditions) impacts any portion of the project such that the project completion date is delayed (regardless of whether work is being performed on any other scheduled portion of the project during that time), then that day shall be deemed an Inclement Weather Day or Rain Day.

   b. Roofing Projects – If rain or wet roof surface prevents the performance of the work for seven continuous hours between 7 a.m. and 4 p.m. and/or an inclement weather forecast (reported by the National Weather Service by 8 a.m. the same day that the work in question is scheduled) of 30% or more probability of precipitation, which would impact the work for seven continuous hours between the hours of 7 a.m. and 4 p.m., then that day shall be deemed an Inclement Weather Day or Rain Day.

E. Work Commencement:

The Contractor shall notify the Inspector forty-eight (48) hours prior to starting or restarting work on the project.

F. Cover-up Inspection

1. The Contractor shall notify the Inspector a minimum of forty-eight (48) hours prior to any cover-up inspection. Any work covered-up prior to inspection and sign off shall be considered non-conforming to contract requirements.

G. Concrete Placement:

For all concrete placement of twenty (20) cubic yards or greater, placement must begin no later than 10:00 a.m. on the day scheduled for the placement. If not begun by 10:00 a.m., Harris County, at its sole discretion, and without time or monetary consequences, may reschedule to ensure proper concrete placement and finishing.

H. Wage Scale Posting:

The Contractor shall post the wage scale at all times at the site of work in a prominent place where it can be easily seen by the workers.

I. Pay Estimate Posting:

The most current processed monthly pay estimate for the project shall be posted at the site of work in a prominent place where it can be easily seen by the subcontractors.

*J. SECURITY:*

*DUE TO THE SENSITIVE LOCATION OF THE CONSTRUCTION GC IS REQUIRED TO PROVIDE LAW ENFORCEMENT SECURITY. COORDINATE WITH HARRIS COUNTY PM FOR EXACT REQUIREMENTS AND HOURS.*

## PART 3 - CONTRACT ADMINISTRATION

3.01 PROCEDURES

A. Clarifications:

All clarifications required by the Contractor shall be requested in an expeditious manner from the Architect in the written form of a Request for Information (RFI). The Contractor shall copy Harris County Public Infrastructure, Engineering Division on all RFI documents. No additional compensation to the Contractor will be allowed for delays resulting from late requests for clarifications. Responses to RFI's will not be binding on Harris County until confirmed in writing by the Architect.

B. Field Modifications:

No person shall have the authority to verbally alter the requirements of the contract documents. No field modifications will be binding on Harris County unless confirmed in writing from the Architect, or documented, signed and dated by the Architect on the set of "Record Drawings" in the field office.

C. Changes in Contract:

1. All proposed costs for a change in contract must be supported by itemized accounting of material, equipment and labor in sufficient detail to allow value analysis by the Architect using current cost estimating guides prevalent in the area. Harris County shall have up to fourteen (14) calendar days from date of receipt of written proposal for review and approval by the Architect.

2. For general construction work, the Contractor will be allowed the actual cost for materials from supply houses, the total amount of wages paid for labor, and the total cost of Federal Old Age Benefits (Social Security Tax) and of Worker's Compensation and Public Liability Insurance, plus cost of Bond if the size of the change warrants revision of the bonds. To the total of the above costs, the Contractor will be allowed to add a percentage as noted below to cover overhead and profit combined. Overhead shall be considered to include insurance other than mentioned herein, field and office supervisors, Project Managers and assistants, clerical work, use of small hand tools, incidental job burdens

(i.e. telephone, electricity, dumpster costs) and general home office expense, and no separate allowance will be made therefor. Allowable percentages for overhead and profit on changes shall not exceed 15%. In no way shall the cumulative cost burden to Harris County for overhead and profit exceed 15% including the General Contractor and his Subcontractors combined.

3. On changes involving both additions and deletions, percentages for overhead and profit will be allowed only on the net addition.

D. Separate Construction by Harris County:

Harris County may administer separate construction contract(s) on this project site simultaneously. Harris County may coordinate the separate contracts and the Contractor shall extend full cooperation towards successful execution of all separate contracts.

E. Preservation and Restoration of Property:

Harris County reserves the right to repair damages to existing property made necessary through an act, omission or misconduct, or in consequence of the non-performance of the Work on the part of the Contractor, his employees or subcontractors, if the Contractor fails to respond to written demand for the repair within 24 hours of such notification. Repairs made by the County on the Contractor's behalf shall be reimbursed by the Contractor to the County or said costs of repairs may be deducted from amounts owed to the Contractor.

F. Commissioning:

Commissioning of the facility shall occur prior to substantial completion. The commissioning process shall include representatives from the Design Team, Contract Administration and County Agencies responsible for the operation and maintenance of the facility.

G. Substantial Completion:

Substantial Completion occurs when the project can be occupied and used for its intended purpose. Substantial completion occurs when all mechanical, electrical and plumbing systems and fixtures are operational and the building or portion of the building can be occupied for its intended purpose. Factors such as the lack of door hardware, security features, life safety devices, fire and smoke alarm testing, and too many other aspects too numerous to list may mitigate against a project being substantially complete for the purpose of stopping the contract time. The Architect shall issue a substantial completion certificate setting forth a time limit for remedying the punch list items, as determined by the Architect. The substantial completion certificate effectively stops the contract time. Failure of the Contractor to complete punch list items within the time limit shall result in the assessment of liquidated damages being assessed against the contract in an amount equal to one half of the liquidated damages applicable to delays prior to substantial completion. Warranty periods and dates for the owner to assume responsibility for utilities, shall be the date of substantial completion.

H. Warranties:

1. All items having a manufacturer's warranty installed under this contract shall be installed by or under the directive of the manufacturer or his certified agent in order to conform with the manufacturer's warranty requirements. All work involving manufacturer's products shall be performed in accordance with manufacturer's recommendations in order to maintain all warranties.

2. Immediately prior to expiration of the one (1) year standard warranty period, or any extended warranty such as roofing, the Contractor shall make an inspection of the Work in the company of the Architect. The Architect shall be given not less than fourteen (14) calendar days notice prior to the anticipated date of warranty expiration.

3. Where any portion of the Work has proven to be defective and requires replacement, repair or adjustment, the Contractor shall immediately provide materials and labor necessary to remedy such defective Work and shall prosecute such Work without delay until completed to the satisfaction of the Architect, even though the date of completion of the corrective work may extend beyond the expiration date of the warranty period.

**END OF SECTION**

## SECTION 012500 - SUBSTITUTION PROCEDURES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use form provided in Project Manual.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES or other agency approved by local authority.
      j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
      k. Cost information, including a proposal of change, if any, in the Contract Sum.
      l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
      m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
    b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

## PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
    1. 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:
        a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
        b. Requested substitution provides sustainable design characteristics that specified product provided.
        c. Substitution request is fully documented and properly submitted.
        d. Requested substitution will not adversely affect Contractor's construction schedule.
        e. Requested substitution has received necessary approvals of authorities having jurisdiction.
        f. Requested substitution is compatible with other portions of the Work.
        g. Requested substitution has been coordinated with other portions of the Work.
        h. Requested substitution provides specified warranty.
        i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
    1. 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:
        a. 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.
        b. Requested substitution does not require extensive revisions to the Contract Documents.
        c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
        d. Requested substitution provides sustainable design characteristics that specified product provided.
        e. Substitution request is fully documented and properly submitted.
        f. Requested substitution will not adversely affect Contractor's construction schedule.
        g. Requested substitution has received necessary approvals of authorities having jurisdiction.
        h. Requested substitution is compatible with other portions of the Work.
        i. Requested substitution has been coordinated with other portions of the Work.

j. Requested substitution provides specified warranty.
k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 012500**

**SECTION 012500.13 - SUBSTITUTION REQUEST FORM**

PROJECT: _____ **(After Contract Award)**

TO: _____
NO. _____
DATE:_____

Contractor hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section "Substitution Procedures:"

**1. SPECIFIED PRODUCT OR SYSTEM**

Substitution request for: _____

Specification Section No.: _____Article/ Paragraph: _____

**2. REASON FOR SUBSTITUTION REQUEST**

SPECIFIED PRODUCT . . .

- ☐ Is no longer available.
- ☐ Is unable to meet project schedule.
- ☐ Is unsuitable for the designated application.
- ☐ Cannot interface with adjacent materials.
- ☐ Is not compatible with adjacent materials.
- ☐ Cannot provide the specified warranty.
- ☐ Cannot be constructed as indicated
- ☐ Cannot be obtained due to one or more of the following:
  - ☐ Strike
  - ☐ Lockout
  - ☐ Bankruptcy of manufacturer or supplier
  - ☐ Similar occurrence (explain below)

PROPOSED PRODUCT . . .

- ☐ Will reduce construction time
- ☐ Will result in cost savings of $ _____ to Project
- ☐ Is for supplier's convenience
- ☐ Is for subcontractor's convenience
- ☐ Other:_____

_____

**3. SUPPORTING DATA**

- ☐ Drawings, specifications, product data, performance data, test data, and any other necessary information to facilitate review of the Substitution Request is attached.
- ☐ Sample is attached.
- ☐ Sample will be sent if requested.

**4. QUALITY COMPARISON**

Provide all necessary side-by-side comparative data as required to facilitate review of Substitution Request:

| | SPECIFIED PRODUCT | PROPOSED PRODUCT |
|---|---|---|
| Manufacturer: | _____ | _____ |
| Name / Brand: | _____ | _____ |
| Catalog No.: | _____ | _____ |
| Vendor: | _____ | _____ |
| Variations: | _____ | _____ |

(Add Additional Sheets If Necessary)

Local Distributor or Supplier: _____

Maintenance Service Available: ☐ Yes ☐ No

Spare Parts Source: _____

Warranty: ☐ Yes ☐ No _____ Years

**5. PREVIOUS INSTALLATIONS**

Identification of at least three similar projects on which proposed substitution was used:

PROJECT #1:

Project: _____

Address: _____

_____

Architect: _____

Owner: _____

Contractor: _____

Date Installed: _____

PROJECT #2:

Project: _____

Address: _____

_____

Architect: _____

Owner: _____

Contractor: _____

Date Installed: _____

**6. EFFECT OF SUBSTITUTION**

Proposed substitution affects other work or trades: ☐ No ☐ Yes (if yes, explain)

_____

_____

Proposed substitution requires dimensional revisions or redesign of architectural, structural, M-E-P, life safety, or other work:

☐ No ☐ Yes (if yes, attach data explaining revisions)

**7. STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS**

Contractor and Subcontractor have investigated the proposed substitution and hereby represent that:

A. They have personally investigated the proposed substitution and believe that it is equal to or superior in all respects to specified product, except as stated above;

B. The proposed substitution is in compliance with applicable codes and ordinances;

C. The proposed substitution will provide same warranty as specified for specified product;

D. They will coordinate the incorporation of the proposed substitution into the Work, and will include modifications to the Work as required to fully integrate the substitution;

E. They have included complete cost data and implications of the substitution (attached);

F. They will pay any redesign fees incurred by the Architect or any of the Architect's consultants, and any special inspection costs incurred by the Owner, caused by the use of this product;

G. They waive all future claims for added cost or time to the Contract related to the substitution, or that become known after substitution is accepted.

H. The Architect's approval, if granted, will be based upon reliance upon data submitted and the opinion, knowledge, information, and belief of the Architect at the time decision is rendered and Addendum is issued; and that Architect's approval therefore is interim in nature and subject to reevaluation and reconsideration as additional data, materials, workmanship, and coordination with other work are observed and reviewed.

Contractor:_____
*(Name of Contractor)*

Date: _____ By: _____

Subcontractor:_____
*(Name of Subcontractor)*

Date: _____ By: _____

***Note: Unresponsive or incomplete requests will be rejected and returned without review.***

**8. ARCHITECT'S REVIEW AND ACTION**

☐ Substitution is accepted.

☐ Substitution is accepted, with the following comments:_____

_____

_____

☐ Resubmit Substitution Request:

☐ Provide more information in the following areas: _____

_____

_____

☐ Provide proposal indicating amount of savings / credit to Owner

☐ Bidding Contractor shall sign Bidder's Statement of Conformance

☐ Bidding Subcontractor shall sign Bidder's Statement of Conformance

☐ Substitution is not accepted:

☐ Substitution Request received too late.

- ☐ Substitution Request received directly from subcontractor or supplier.
- ☐ Substitution Request not submitted in accordance with requirements.
- ☐ Substitution Request Form is not properly executed.
- ☐ Substitution Request does not indicate what item is being proposed.
- ☐ Insufficient information submitted to facilitate proper evaluation.
- ☐ Proposed product does not appear to comply with specified requirements.
- ☐ Proposed product will require substantial revisions to Contract Documents.

By: _____

Date:_____

Architect has relied upon the information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to be not in compliance with the Contract Documents, Contractor shall provide the specified product.

**9. OWNER'S REVIEW AND ACTION**

- ☐ Substitution is accepted; Architect to prepare Change Order.
- ☐ Substitution is not accepted.
- ☐ Owner will pay Architect directly for redesign fees.
- ☐ Include Architect's Additional Service fee for implementing the substitution in the Change Order.

By: _____

Date:_____
*(Owner's Representative)*

**END OF FORM**

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

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

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
      e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or other forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include costs of labor and supervision directly attributable to the change.
   5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or other form acceptable to Architect.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. ConstructionChange Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the ConstructionChange Directive.
   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 012600**

## SECTION 012900 - PAYMENT PROCEDURES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
   1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with continuation sheets.
      b. Submittal schedule.
      c. Items required to be indicated as separate activities in Contractor's construction schedule.
   2. Submit the schedule of values to Architect at earliest possible date, but no later than sevendays before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the schedule of values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange schedule of values consistent with format of AIA Document G703 .
   3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the Work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
         1) Labor.
         2) Materials.
         3) Equipment.
   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
      a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
   5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
   2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
   3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
   4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
   1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
   2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
   3. Provide summary documentation for stored materials indicating the following:
      a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
      b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
      c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
   1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
   2. When an application shows completion of an item, submit conditional final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Schedule of unit prices.
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.

J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 012900**

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. Requests for Information (RFIs).
   4. Project Web site.
   5. Project meetings.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
   1. Post copies of list in project meeting room, in temporary field office, [on Project Web site, ]and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

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 to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

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.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities 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.

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

1.6 COORDINATION DRAWINGS
A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
e. Indicate required installation sequences.
f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are

otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
   1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
   2. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
      a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
   3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
      a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
      b. Digital Data Software Program: Refer to Section 011000 "Summary" for digital data software program.
      c. Contractor shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
   1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor 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 information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date.
   4. Name of Contractor.
   5. Name of Architect.
   6. RFI number, numbered sequentially.
   7. RFI subject.
   8. Specification Section number and title and related paragraphs, as appropriate.
   9. Drawing number and detail references, as appropriate.
   10. Field dimensions and conditions, as appropriate.
   11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   12. Contractor's signature.
   13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
      a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
   1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
   1. The following Contractor-generated RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Requests for coordination information already indicated in the Contract Documents.
      e. Requests for adjustments in the Contract Time or the Contract Sum.
      f. Requests for interpretation of Architect's actions on submittals.
      g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
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 Section 012600 "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 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

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 days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 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: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. 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. Lines of communications.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Sustainability design requirements.
    l. Preparation of record documents.
    m. Use of the premises.
    n. Work restrictions.
    o. Responsibility for temporary facilities and controls.
    p. Procedures for moisture and mold control.
    q. Procedures for disruptions and shutdowns.
    r. Construction waste management and recycling.
    s. Parking availability.
    t. Office, work, and storage areas.
    u. Equipment deliveries and priorities.
    v. First aid.
    w. Security.
    x. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Sustainability Coordination Conference: Conduct a coordination conference before starting construction, at a time convenient to Owner, Architect, and Contractor.
   1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent and Sustainability coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. 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 meeting requirements for Sustainability certification, including the following:
      a. Sustainability Project Checklist.
      b. General requirements for Sustainability-related procurement and documentation.
      c. Project closeout requirements and Sustainability certification procedures.
      d. Role of Sustainability coordinator.
      e. Construction waste management.
      f. Construction operations and Sustainability requirements and restrictions.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

D. 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 [, and Owner's Commissioning Authority] 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. Contract Documents.
      b. Options.
      c. Related RFIs.
      d. Related Change Orders.
      e. Purchases.
      f. Deliveries.
      g. Submittals.
      h. Sustainability design requirements.
      i. Review of mockups.
      j. Possible conflicts.
      k. Compatibility requirements.
      l. Time schedules.
      m. Weather limitations.
      n. Manufacturer's written instructions.
      o. Warranty requirements.
      p. Compatibility of materials.
      q. Acceptability of substrates.
      r. Temporary facilities and controls.
      s. Space and access limitations.
      t. Regulations of authorities having jurisdiction.
      u. Testing and inspecting requirements.
      v. Installation procedures.
      w. Coordination with other work.
      x. Required performance results.
      y. Protection of adjacent work.
      z. 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 other parties requiring information.
   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.

E. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
   1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Requirements for completing sustainable design documentation.
    e. Requirements for preparing operations and maintenance data.
    f. Requirements for delivery of material samples, attic stock, and spare parts.
    g. Requirements for demonstration and training.
    h. Preparation of Contractor's punch list.
    i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    j. Submittal procedures.
    k. Owner's partial occupancy requirements.
    l. Installation of Owner's furniture, fixtures, and equipment.
    m. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

F. Progress Meetings: Conduct progress meetings at regular intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. 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 meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
        1) Review schedule for next period.
    b. Review present and future needs of each entity present, including the following:
        1) Interface requirements.
        2) Sequence of operations.
        3) Resolution of BIM component conflicts.
        4) Status of submittals.
        5) Status of sustainable design documentation.
        6) Deliveries.
        7) Off-site fabrication.
        8) Access.
        9) Site utilization.
        10) Temporary facilities and controls.
        11) Progress cleaning.
        12) Quality and work standards.
        13) Status of correction of deficient items.
        14) Field observations.
        15) Status of RFIs.
        16) Status of proposal requests.
        17) Pending changes.
        18) Status of Change Orders.
        19) Pending claims and disputes.
        20) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

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.

G. Coordination Meetings: Conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

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

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 013100**

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Startup construction schedule.
   2. Contractor's construction schedule.
   3. Construction schedule updating reports.
   4. Daily construction reports.
   5. Material location reports.
   6. Site condition reports.
   7. Special reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

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

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

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
   3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
   1. Working electronic copy of schedule file, where indicated.
   2. PDF electronic file.

B. Startup construction schedule.
   1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

D. Construction Schedule Updating Reports: Submit with Applications for Payment.

E. Daily Construction Reports: Submit at weekly intervals.

F. Material Location Reports: Submit at monthly intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

H. Special Reports: Submit at time of unusual event.

I. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
   1. Review software limitations and content and format for reports.
   2. Verify availability of qualified personnel needed to develop and update schedule.
   3. Review delivery dates for Owner-furnished products.
   4. Review schedule for work of Owner's separate contracts.
   5. Review submittal requirements and procedures.
   6. Review time required for review of submittals and resubmittals.
   7. Review requirements for tests and inspections by independent testing and inspecting agencies.
   8. Review time required for Project closeout and Owner startup procedures.
   9. Review and finalize list of construction activities to be included in schedule.
   10. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

**PART 2 - PRODUCTS**

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
   4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
   5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
   6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
   1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
   2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
      a. Subcontract awards.
      b. Submittals.
      c. Purchases.
      d. Mockups.
      e. Fabrication.
      f. Sample testing.

g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Building flush-out.
m. Startup and placement into final use and operation.

3. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
   a. Structural completion.
   b. Temporary enclosure and space conditioning.
   c. Permanent space enclosure.
   d. Completion of mechanical installation.
   e. Completion of electrical installation.
   f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
   1. Temporary enclosure and space conditioning.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
   1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
   1. Unresolved issues.
   2. Unanswered Requests for Information.
   3. Rejected or unreturned submittals.
   4. Notations on returned submittals.
   5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for commencement of the Work. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for commencement of the Work.
      a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
   2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
   3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Mobilization and demobilization.

c. Purchase of materials.
d. Delivery.
e. Fabrication.
f. Utility interruptions.
g. Installation.
h. Work by Owner that may affect or be affected by Contractor's activities.
i. Testing.
j. Punch list and final completion.
k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
   a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
   b. Total cost assigned to activities shall equal the total Contract Sum.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
   a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

2.3 REPORTS

A. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported

plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

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

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

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

## PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 013200**

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. 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. Processing Time: Allow 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. Submittals received after 1:00 pm will be considered to have been received the following day.
1. Initial Review: Allow 10 business 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. Large Submittal Review: Allow 20 business days for large or complex submittal packages (e.g. Millwork, Curtainwall, Structural Steel, Door Frames and Hardware)

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
    a. Naming Convention: File name shall use the following format:
        1) [Specification section] – [Package number] – [Revision number] [Brief description]
        2) 061000-01-00 Rough Carpentry.pdf
    b. For large Campus type projects with multiple buildings, add a Building ID after the revision identifier as follows:
        1) 061000-01-00 (BLDG 1) Rough Carpentry.pdf
    c. Return Submittals: Submittals returned from Kirksey to have ‘k’ after the revision number, as follows:
        1) 061000-01-00 k Rough Carpentry.pdf
        2)
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Contractor.
    e. Name of firm or entity that prepared submittal.
    f. Names of subcontractor, manufacturer, and supplier.
    g. Category and type of submittal.
    h. Submittal purpose and description.
    i. Specification Section number and title.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Related physical samples submitted directly.
    m. Indication of full or partial submittal.
    n. Transmittal number, numbered consecutively.
    o. Submittal and transmittal distribution record.
    p. Other necessary identification.
    q. Remarks.
5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
    a. Project name.
    b. Number and title of appropriate Specification Section.
    c. Manufacturer name.
    d. Product name.

D. Options: Identify options requiring selection by Architect.

E. Deviations and Additional Information: 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 identification information as related submittal.

F. 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 with approval notation from Architect's action stamp.

G. 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.

H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Post electronic submittals as PDF electronic files directly to Architect's (Newforma) Info Exchange website specifically established for Project.
      a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

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 published 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 catalog cuts.
      b. Manufacturer's product specifications.
      c. Standard color charts.
      d. Statement of compliance with specified referenced standards.
      e. Testing by recognized testing agency.
      f. Application of testing agency labels and seals.
      g. Notation of coordination requirements.
      h. Availability and delivery time information.
   4. For equipment, include the following in addition to the above, as applicable:
      a. Wiring diagrams showing factory-installed wiring.
      b. Printed performance curves.
      c. Operational range diagrams.
      d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
   5. Submit Product Data before or concurrent with Samples.
   6. Submit Product Data in the following format:
      a. PDF electronic file.

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, unless submittal based on Architect's digital data drawing files is otherwise permitted.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products.
      b. Schedules.
      c. Compliance with specified standards.
      d. Notation of coordination requirements.
      e. Notation of dimensions established by field measurement.
      f. Relationship and attachment to adjoining construction clearly indicated.
      g. Seal and signature of professional engineer if specified.
   2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
   3. Submit Shop Drawings in the following format:
      a. PDF electronic file.

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 applicable Specification Section.
   3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
   4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
      b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
   5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
      a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
   6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
      a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
         1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
         2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
   1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
   2. Manufacturer and product name, and model number if applicable.
   3. Number and name of room or space.
   4. Location within room or space.
   5. Submit product schedule in the following format:
      a. PDF electronic file.

F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Insert definition of Contractor certificates here if required by individual Specification Sections. See Evaluations.

N. Installer Certificates: Submit 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.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit 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.

S. Product Test Reports: Submit written reports indicating that 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.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports 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.

X. Design Data: Prepare and submit 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.

2.2 DELEGATED-DESIGN SERVICES

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 Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, 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. Action and Informational Submittals: 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. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. 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. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. 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.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

F. The Architect stamps each submittal with an action stamp and marks the stamp appropriately to indicate action, as follows:

1. Reviewed: No resubmittal required. Final unrestricted release. When the Architect marks a submittal “Reviewed,” the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
2. Furnish as Corrected: No resubmittal required. Final-but-restrictive release. When the Architect marks a submittal “Furnish as Corrected,” the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
3. Revise and Resubmit: Resubmittal required. When the Architect marks a submittal “Revise and Resubmit,” do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay.
4. Rejected: Resubmittal required. When the Architect marks a submittal “Rejected,” the submittals does not have Contractor’s stamp, or does not match Contract Documents.
5. No Action Taken: No resubmittal required. Filed for record only. When the Architect marks a submittal “No Action Taken,” the submittal is either informational or not required per the contract documents and is filed as a record only.
6. Partial Re-submittal: Resubmittal required. Individual potions of a submittal are noted (Reviewed / Furnish as Corrected) and others are noted (Revise and Resubmit). Partial Re-submittal allows Architect to mark individual components to allow GC to proceed. Portions of the submittal that are not marked for release should be resubmitted for review

**END OF SECTION 013300**

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for 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 specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., 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. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being

familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: 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 conflicting 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.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
   1. Indicate manufacturer and model number of individual components.
   2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data : For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
   1. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

D. Testing Agency Qualifications: 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.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
   1. Specification Section number and title.
   2. Entity responsible for performing tests and inspections.
   3. Description of test and inspection.
   4. Identification of applicable standards.
   5. Identification of test and inspection methods.
   6. Number of tests and inspections required.
   7. Time schedule or time span for tests and inspections.
   8. Requirements for obtaining samples.
   9. Unique characteristics of each quality-control service.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of technical 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.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement that equipment complies with requirements.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   4. Statement whether conditions, products, and installation will affect warranty.
   5. Other required items indicated in individual Specification Sections.

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

1.8 QUALITY ASSURANCE

A. 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.

B. 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.

C. 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.

D. If other design professionals are indicated in Specification Sections, insert qualifications here.

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 in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. 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.

J. 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, and 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.

K. 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 Architectseven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. 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.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

M. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Provide room mockups of the following rooms:

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. 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.
2. 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.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. 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 Section 013300 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/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.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. 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.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
   1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

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

B. "Special Tests and Inspections" Paragraph below is an alternative to "Special Tests and Inspections" Paragraph above that allows individual Specification Sections to define who is responsible for special tests and inspections.

C. Special Tests and Inspections: Conducted by a qualified testing agency [and **special inspector**] as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews 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. Test and Inspection Log: 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 revisions 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 or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 014000**

## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

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

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION (Not Used)

**END OF SECTION 014200**

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. 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; and comparable products.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process 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. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," 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 additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
   2. 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 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
      a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
      b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
   1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

**PART 2 - PRODUCTS**

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, 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. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated 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 requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require 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 016000**

## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.
B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.
B. Certificate of Insurance: For continuing coverage.
C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
      a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
   5. Submit test/adjust/balance records.
   6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Advise Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. 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.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. 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.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, 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.
4. Submit list of incomplete items in the following format:
   a. MS Excel electronic file. Architect will return annotated file.
   b. PDF electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: 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, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
   1. Bind warranties and bonds in heavy-duty, three-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.
   4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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: Perform 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 designated portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.
      e. Remove snow and ice to provide safe access to building.
      f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
      g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
      h. Sweep concrete floors broom clean in unoccupied spaces.
      i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
      j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
      k. Remove labels that are not permanent.
      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. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
D. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

**END OF SECTION 017700**

## SECTION 017823 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operation and maintenance documentation directory.
   2. Emergency manuals.
   3. Operation manuals for systems, subsystems, and equipment.
   4. Product maintenance manuals.
   5. Systems and equipment maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect [and Commissioning Authority] will comment on whether content of operations and maintenance submittals are acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:
   1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
      a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
      b. Enable inserted reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect [and Commissioning Authority] will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect [and Commissioning Authority] will return copy with comments.
   1. Correct or revise each manual to comply with Architect's [and Commissioning Authority's] comments. Submit copies of each corrected manual within 15 days of receipt of Architect's [and Commissioning Authority's] comments and prior to commencing demonstration and training.

### PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
   1. List of documents.
   2. List of systems.
   3. List of equipment.
   4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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: 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 and contact information for Contractor.
6. Name and contact information for Architect.
7. [Name and contact information for Commissioning Authority.]
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
a. Avoid placing loose, oversize drawings in binder pockets. Use reduced drawings or place folded drawings in labeled envelopes bound in manual.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 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. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.
B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.
C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.
D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS
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 and drawing or schedule designation or identifier where applicable.
C. Product Information: Include the following, as applicable:
1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.

5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

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 and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard 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.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

## PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. 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.

E. 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.

F. 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 Section 017839 "Project Record Documents."

G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION 017823**

## SECTION 017839 - PROJECT RECORD DOCUMENTS

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.
   4. Miscellaneous record submittals.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit one set of marked-up record prints.
   2. Number of Copies: Submit copies of record Drawings as follows:
      a. Initial Submittal:
         1) Submit record digital data files and one set(s) of plots.
         2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal:
         1) Submit one paper-copy set(s) of marked-up record prints.
         2) Submit record digital data files and three set(s) of record digital data file plots.
         3) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
   1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report ]indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   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 provide information for preparation of corresponding 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 acceptable drawing technique.
      c. Record data as soon as possible after obtaining it.
      d. Record and check the markup before enclosing concealed installations.
      e. Cross-reference record prints to corresponding archive photographic documentation.
   2. Content: Types of items requiring marking include, but are not limited to, the following:
      a. Dimensional changes to Drawings.

b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
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. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
b. Architect will provide data file layer information. Record markups in separate layers.

C. 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.

D. 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. Format: Annotated PDF electronic file[ with comment function enabled].
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. 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, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. If possible, a Change Order proposal should include resubmitting updated Product Data. This eliminates the need to mark up the previous submittal.
4. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## 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 revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

**END OF SECTION 017839**

**SECTION 020700 - SELECTIVE DEMOLITION**

**PART 1 - GENERAL**

1.01 DESCRIPTION OF WORK

A. Furnish all materials, tools, equipment, labor, and supervision; and obtain all permits necessary to perform the following repairs as shown on the Drawings and specified herein; in accordance with the provisions of the General Requirements - Division 1, and completely coordinated with the Work of all other trades:

1. Complete removal of existing window wall openings and entry doors on the 1th floor including the perimeter joint sealant.

B. Related work specified elsewhere:

1. Section 079200 – Joint Sealants
2. Section 080151.82 – Replacement Aluminum Windows

1.02 QUALITY ASSURANCE

A. Work under this section shall be subject to all applicable provisions of state and local building and safety codes.

B. Contractor Qualifications

1. Contractor must have a minimum of five years experience in construction and supervision of window systems replacements. Such experience must include projects of comparable scope and extent to this project.
2. Contractor shall use competent and qualified personnel.

C. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

1. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

D. A full-time on site supervisor shall be provided by the Contractor for the duration of the concrete repair work. The Contractor's supervisor shall have a minimum of five years of experience performing similar concrete repairs.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 013300 prior to beginning the Work:

1. Schedule showing the proposed sequence of demolition and removal operations.
2. Written description of removal methods and a list of major tools and equipment to be used.
3. Design and location of required bracing, shoring, and overhead protection necessary to perform the work and protect the existing adjacent finishes.
4. Copies of permits for transport and disposal of debris.

1.04 SITE CONDITIONS

A. The structure is to remain in partial operation during the repairs. Design and provide temporary canopies, walls, and signage to ensure the safe passage of persons in and around the areas of demolition or inspect and provide written acceptance of existing safeways. Conduct operations to prevent injury to persons, the structure, and other facilities.

1. Notify building maintenance personnel 24 hour prior to preforming any demolition or procedures that will create noise or air pollution to the floor above or below where the work is intended to be performed.
2. Use of chemicals that are known to have any odor must be pre-approved by architect and owner 48 hours prior to their use.

3. Movement of materials into and out of the building should be done from the exterior where and whenever possible to limit disruption to the building employees.

B. Existing Conditions

1. The Owner and Architect assume no responsibility for existing conditions. The Contractor shall be responsible for performing all pre-demolition investigation necessary for the safe operation of the work.
2. Examine the areas and conditions where demolition work will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

1.05 CHANGES IN THE WORK

A. During the repair work, the Contractor may encounter existing conditions which are not now known or are at variance with the drawings or specification (discovery). The Contractor shall notify the Architect of all discoveries he believes may interfere with proper execution of the work. The Architect will review the situation and inform the Contractor of necessary changes, if any. The Contractor shall not proceed with work related to such discoveries until authorized by the Architect.

B. In the event of discrepancies within the Drawings, within the Specifications, or between the Drawings and specification, the more stringent of the two items shown shall be considered to be shown or specified at all locations where the discrepancies occur. The Architect shall be notified of such discrepancies.

1.06 PAYMENT

A. Payment for complete removal of the strip window wall opening at locations shown in the Drawings shall be based on the lump sum price for strip window wall opening removal in accordance with Section 004213. Contractor's costs for partial removal of the strip window wall opening at locations shown in the drawings shall be included in the lump sum price for strip window wall opening removal repair in accordance with Section 004213. Contractor's costs for all other demolition work shall be included in the unit and per item prices for the work item requiring demolition.

**PART 2 - PRODUCTS**

2.01 MATERIAL STORAGE

A. Temporarily store debris from demolition at location designated by Owner or remove immediately from the site.

2.02 EQUIPMENT

A. The Contractor shall use the appropriate demolition equipment to avoid damaging the substrate below the repair area.

B. Equipment for removal of unsound concrete, shall be limited to hand tools, powered saws, powered grinders, and chipping hammers of nominal 15 lb. class or less.

C. Scaffolding and bracing for accessing and shoring the concrete masonry walls shall comply with all applicable OSHA regulations.

**PART 3 - EXECUTION**

3.01 CLEANUP

A. Upon completion of daily work, leave work areas in broom clean condition.

B. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Cleanup spillage from streets and adjacent areas.

C. Comply with federal, state, and local hauling and disposal regulations.

**END OF SECTION**

## SECTION 024119 - SELECTIVE DEMOLITION

## 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. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Submit before Work begins.

1.7 FIELD CONDITIONS

A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

**PART 2 - PRODUCTS**

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
   1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
   2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
   1. Comply with requirements specified in Section 013233 "Photographic Documentation."
   2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
   3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
      b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

B. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
10.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. If needed, insert requirements for other types of finishes.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

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

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 024119**

# SECTION 072113 - BOARD INSULATION

## PART 1 GENERAL

### 1.1 SUMMARY

A. This Section specifies stone fiber board insulation for general board insulation applications.

### 1.2 RELATED REQUIRMENTS

A. Section 080151 – Replacement Windows

### 1.3 REFERENCE STANDARDS

A. ASTM International (ASTM)
   1. ASTM C165 - 2012, Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
   2. ASTM C356 - 2010, Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
   3. ASTM C411 - 2011, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
   4. ASTM C518 - 2010, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
   5. ASTM C612 - 2010, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
   6. ASTM C665 - 2011, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   7. ASTM C795 - 2013, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
   8. ASTM C1104/C1104M - 2006, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
   9. ASTM C1338 - 2008, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
   10. ASTM E84 - 2012b, Standard Test Method for Surface Burning Characteristics of Building Materials.
   11. ASTM E96/E96M - 2010, Standard Test Methods for Water Vapor Transmission of Materials.
   12. ASTM E136 - 2011, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

### 1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract before starting work of this Section to verify project requirements, substrate conditions and coordination with other building subtrades, and to review manufacturer's written installation instructions.
   1. Comply with Project Meetings and co-ordinate with other similar pre-installation meetings.
   2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
      a. Owner
      b. Consultant
      c. Board Insulation Installation Subcontractor
      d. Manufacturer's Technical Representative.
   3. Ensure meeting agenda includes review of methods and procedures related to insulation installation including co-ordination with related work.
   4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

A. Make submittals in accordance with Contract Conditions.

B. Product Data: Submit product data including manufacturer's literature for insulation materials and accessories, indicating compliance with specified requirements and material characteristics.
   1. Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into Work.
   2. MSDS report.
   3. Include product name.
   4. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
   5. Include contact information for manufacturer and their representative for this Project.

C. Samples:
   1. Submit 5.5 x 7.5 inches minimum sample of insulation in thickness used on Project.

D. Test Reports:
   1. Submit evaluation service reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.

E. Insulation Installer Qualifications:
   1. Submit letter verifying insulation installer's experience with work similar to work of this Section.

## 1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Supply maintenance data for insulation materials for incorporation into manual - Closeout Submittals.

B. Record Documentation: Closeout Submittals.
   1. List materials used in insulation work.
   2. Warranty: Submit warranty documents specified.

## 1.7 QUALITY ASSURANCE

A. Board Insulation Installer Quality Assurance: Work experience of 3 years minimum with work similar to work of this Section.

## 1.8 DELIVERY STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver materials and accessories in insulation manufacture's original packaging with identification labels intact and in sizes to suit project.
   2. Ensure insulation materials are not exposed to moisture during delivery.
   3. Replace wet or damaged insulation materials.

B. Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in original packaging until installed.

## 1.9 WARRANTY

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

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

C. Warranty period: 1 years commencing on Date of Substantial Performance of Work.

## PART 2.0 PRODUCTS

### 2.1 MANUFACTURER

A. Manufacturer: ROXUL INC., 420 Bronte Street South, Suite 105, Milton, Ontario, L9T 0H9, Phone: 905-878-8474, Toll Free: 1-800-265-6878, e-mail: contactus@roxul.com, URL: www.rspec.com.

### 2.2 DESCRIPTION

A. Un-aced non-combustible, semi-rigid, mineral wool insulation board to ASTM C612.

### 2.3 PERFORMANCE CRITERIA

A. General purpose board insulation: To ASTM C612, Type IVA.
   1. Fire performance:
      a. Non-combustibility: To ASTM E136.
      b. Surface Burning Characteristics: To ASTM E84.
         1) Flame spread unfaced: 5.
         2) Smoke developed unfaced: 5.
   2. Thermal resistance R value/1 inch at 75 ºF: 4.2 h $ft^2$ ºF/Btu to ASTM C518.
   3. Water vapor permeance:
      a. Unfaced; 30 Perm maximum.
      b. With PSP facing: 0.2 Perm maximum.
   4. Moisture sorption: 1 % to ASTM C1104/C1104M.
   5. Dimensional stability: 1 % maximum linear shrinkage at 1200 ºF to ASTM C356.
   6. Fungi resistance: Passed to ASTM C1338.
   7. Corrosive resistance:
      a. Steel to ASTM C665: Pass.
      b. Stainless steel to ASTM C795: Conforms.
   8. Density: 4.0 lb/$ft^3$ to ASTM C612.
   9. Recycled content: 16 % minimum.

### 2.4 MATERIALS

A. A. Non-combustible, semi-rigid, mineral wool fire rated insulation board to ASTM C612, Type IVA
   1. Compressive resistance:
      a. At 10 %: 90 psf to ASTM C165.
      b. At 25 %: 226 psf to ASTM C165.
   2. Size: 24 x 48 inches.
   3. Thickness: 3-inches.
      Acceptable Material: ROXUL INC., ROCKBOARD® 40

### 2.5 ACCESSORIES

A. Mechanically attached impaling pins fasteners in accordance with insulation manufacturer's recommendations.
   1. The design of fastened connections is to be completed, reviewed, by a structural engineer.
   2. Embedded depth required to resist fastener pull-out will be per engineers recommendations but not be less than 1-inch embedded depth.

### 2.6 SOURCE QUALITY CONTROL

A. Ensure insulation components and accessories are supplied or approved in writing by single manufacturer.

## 3.0 EXECUTION

### 3.1 INSTALLERS

A. Use only installers with [5] years minimum experience with work similar to work of this Section.

## 3.2 EXAMINATION

A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer's written recommendations.
   1. Visually inspect substrate in presence of Consultant.
   2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
   3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

B. Start of insulation installation indicates installer's acceptance of substrate installation conditions.

## 3.3 INSTALLATION

A. General:
   1. Install insulation in accordance with manufacturer's written recommendations.
   2. Install insulation to maintain continuity of thermal protection to building elements and spaces.
   3. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
   4. Keep insulation minimum [3] inches from heat emitting devices such as recessed light fixtures, and minimum [2] inches from sidewalls of chimneys and vents.
   5. Do not enclose insulation until before inspection and receipt of Consultant's written approval.

A. Installation of Insulation Board:
   1. Install insulation board using [all-purpose construction adhesive] [mechanical fasteners] in accordance with insulation manufacturer's written recommendations.
   2. 2. Attach insulation board with 1.5 inches concrete nails and seal with bitumen sealing compound..

## 3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with Quality Control.

## 3.5 CLEANING

A. Progress Cleaning:
   1. Perform cleanup as work progresses Leave work area clean at end of each day.

B. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment

## 3.6 PROTECTION

A. A. Protect installed products and accessories from damage during construction.
B. Repair damage to adjacent materials caused by insulation installation.

**END OF SECTION 072113 - BOARD INSULATION**

# SECTION 079200

## JOINT SEALANTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Metal window sill and jamb flashing.

### 1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturer(s), for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Use ASTM C 794 and ASTM C 1135 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
   2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
   3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
   5. For non-porous substrates, testing will not be required if joint-sealant manufacturer(s) submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, non-porous joint substrates and other materials matching those submitted.

B. Preconstruction Stain Testing: Submit to joint-sealant manufacturer(s), for testing indicated below, samples of materials for each porous joint sealant substrate.
   1. Test in accordance with ASTM C1248 - 08(2012) “Standard Test Method for Staining of Porous Substrate by Joint Sealants”.
   2. Submit not fewer than eight pieces of each kind of porous material.
   3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including alternate sealant recommendations.

### 1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated, sealant manufacturer’s literature including written instructions for evaluating, preparing, and treating substrate; technical data including tested physical and performance properties; and installation instructions.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

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.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Pre-Construction Test Reports: For each sealant and each sealant substrate.
F. Field-Adhesion Test Reports: For each sealant application tested.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of joint sealant required for this Project. Must have installations of specified materials in local area in use for minimum of five years.
B. Source Limitations: Obtain each kind of joint sealant from a single source and from single manufacturer.
C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section and approved for this Project.
D. Pre-installation Conference: Conduct a pre-installation conference in accordance with the requirements in Division 01.
   1. Conduct meeting at Project site.
   2. Installer’s site foreman, manufacturer’s technical representative, general contractor’s superintendent, Owner’s Representative, Architect/Engineer, and testing agency representative are to be in attendance.
   3. Review requirements, sequencing, and procedures for the joint sealant system.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. Do not proceed with installation during inclement weather except for temporary work necessary to protect building interior and installed materials. Remove temporary work and Work that becomes moisture damaged.
   2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
   3. When joint substrates are wet.
   4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which 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's standard form in which joint-sealant manufacturer agrees to furnish joint sealants 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: 20 years from date of Substantial Completion for silicone sealants.
C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant (S-GP): ASTM C 920, Type S, Grade NS, Class 50/100, for Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Pecora Corporation; 890 NST.
      b. Dow Corning Corporation; 790.
      c. Tremco Incorporated, Spectrum 1.

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant (S-S:) ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. BASF Building Systems; Omniplus.
      b. Dow Corning Corporation; 786 Mildew Resistant.
      c. GE Advanced Materials - Silicones; Sanitary SCS1700.
      d. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 WINDOW SILL AND JAMB FLASHING

A. New Fabricated Metal Flashing, Counterflashing and wind clips, Fascia, Receivers, Roof Expansion Joint Covers, and Miscellaneous Sections: Shop fabricate metal fascias, counterflashing, receivers and similar items to comply with Drawings or with profiles of materials sections in place and adjacent to work. All work to comply with standard industry details as shown by SMACNA in the "Architectural Sheet Metal Manual". Except as otherwise indicated, provide drip edges which project ¾” minimum at a 45 degree angle and folded back to form a hem on the concealed side of exposed edges.
   1. Stainless Steel: Conforming to ASTM A167, Type 304, 24 gauge minimum. Exposed stainless steel sheet metal shall have a Class 4 mill finish, unless otherwise specified.
   2. Aluminum: Conforming to ASTM B202-92a (UNS Alloy Designation A93003-H14 or

A933004-H34), .050" minimum thickness. Exposed aluminum sheet metal shall have a high-performance organic finish, thermocured and containing not less than 70 percent polyvinylidene fluoride resin by weight, complying with AAMA 2604. Color: As selected by Architect from manufacturer's full range.

B. Provide preformed inside and outside corner sections of matching material, finish and profile for all sheet metal work. Corners and transitions must be welded or soldered.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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

D. Backer Rod:

1. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing
2. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed cell material with surface skin), Type O (open cell material), Type B (bicellular material with a surface skin) as approved by the joint sealant manufacturer for the joint application indicated. Provide the appropriates size(s) and density to control the joint sealant depth and profile in accordance with the joint sealant manufacturer's recommendations.
3. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable

## PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.
c. Unglazed surfaces of ceramic tile.
d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. 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 of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
   c. Porcelain enamel.
   d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces. Limit priming to areas that will be covered with sealant in same day. Unless recommended otherwise by sealant manufacturer, reprime areas exposed for more than 24 hours.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

## 3.3 INSTALLATION OF JOINT SEALANTS

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

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. 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.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

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 Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
   4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
   5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 INSTALLATION OF WINDOW SILL AND JAMB FLASHING

A. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
   1. Install true to line and levels indicated.
   2. Where exposed, install without excessive oil canning, buckling, or tool marks.
   3. Provide uniform, neat seams with minimum exposure of solder, welds, or sealant.
   4. Do not torch cut sheet metal.

B. Anchor sheet metal flashing and trim and other components of Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required.

C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant and in compliance with recommendations in SMACNA's Architectural Sheet Metal Manual.

3.5 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured sealant joints as follows:
      a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
      b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
   2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   3. Inspect tested joints and report on the following:
      a. Whether sealants filled joint cavities and are free of voids.
      b. Whether sealant dimensions and configurations comply with specified requirements.
      c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
   4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
   5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. For sealant that has failed adhesively from testing or does not comply with requirements, additional testing will be performed to determine extent of non-conforming sealant. Neatly cut out and remove non-conforming sealant, prepare and prime surfaces, and install new sealant in accordance with the sealant manufacturer's recommendations. Perform field adhesion tests on new sealant. Retest failed applications until test results prove sealants comply with indicated requirements.

3.6 CLEANING

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

3.7 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

**END OF SECTION**

**SECTION 084113 - ALUMINUM-GLAZED ENTRANCES AND STOREFRONTS**

# PART 1 - GENERAL

## 1.1 SUMMARY

A. The work required under this section is for the complete design of a new interior and exterior factory finished entrances and storefront systems, shop fabricated, delivered to the jobsite site knocked down (KD), erected, and conventionally glaze on site. The aluminum storefront system will attach to the building's structural framing system without the anchorage system being visible from the interior finished space. The building's structural engineer has designed the building structural system to accommodate the loads (dead and live loads) imposed upon it by the glazed storefront system. modifications (if any) to the building's structural system that are required to accommodate the anchorage of the glazed aluminum storefront system's specific anchorage design are to be approved by Architect and the buildings Structural Engineer.

B. Reinforcing, shims, and attachment devices for a complete systems installation.

C. Any accessories necessary for a complete installed system.

D. Related Sections:

1. Section 079200 Joint Sealants
2. Section 084413 Glazed Aluminum Curtain Wall
3. Section 084423 Structural Sealant Curtain Walls
4. Section 087100 Door Hardware (delete if included with section 08113)
5. Section 088100 Glass and Glazing

## 1.2 REFERENCES

A. Aluminum Association (AA):

1. DAF-45 Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):

1. 501.1 Standard Method for Water Penetration of Windows, Curtain Walls and Doors using Dynamic Pressure
2. 501.2 Field Check of Storefronts for Water Leakage.
3. 501.4 Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts
4. 2605 Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
5. 611 Voluntary Specification for Anodized Architectural Aluminum
6. 701 Voluntary Specifications for Pile Weather-stripping and replaceable fenestration weather seals.
7. 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
8. 1801 Voluntary Specification for the Acoustical Rating of Window, Doors, and Glazed Wall Sections.
9. CW-10 Care and Handling of Architectural Aluminum from Shop to Site.
10. SFM1 Aluminum Storefront and Entrance Manual.

C. American National Standards Institute (ANSI):

1. Z97.1 Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

D. American Society for Testing and Materials (ASTM):

1. A36 Structural Steel.
2. A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. A525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
5. B209 Aluminum and Aluminum-Alloy Sheet and Plate.
6. B221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
7. B308 Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
8. C716 Installing Lock-Strip Gaskets and Infill Glazing Materials.
9. C920 Elastomeric Joint Sealants.
10. E283 Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.
11. E330 Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

12. E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
13. E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.

E. Consumer Product Safety Commission (CPSC):
1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials.

F. Federal Specifications (FS):
1. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.

G. Glass Association of North America (GANA):
1. . Glazing Manual.

H. Steel Structures Painting Council (SSPC):
1. SP2 Hand Tool Cleaning.
2. SP3 Power Tool Cleaning.
3. Paint 12 Cold-Applied Asphalt Mastic (Extra Thick Film).

**1.3 System Requirements**

A. General Standard: In addition to requirements shown or specified, comply with applicable provisions of Aluminum Guide Design Manual for design, materials, fabrication and installation of component parts.

B. Design Requirements:
1. Metal stick framed systems with interior and exterior exposed metal framing.
2. System fabricator shall provide entrance and storefront system, including necessary modifications to meet specified requirements and maintaining visual design concepts.
3. Fabricate glazing system for exterior glazing at vision and non-vision glazing.
4. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
5. Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
6. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
7. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing anchorage, or moisture disposal.
8. Exclude glass, sealants, and interior finishes when determining framing member strength, stiffness, and lateral stability.
9. Attachment considerations shall take into account site peculiarities and expansion and contraction movements to eliminate loosening, weakening, or fracturing of connections between units and building structure.
10. Anchors, fasteners, and braces shall be structurally stressed not more than 50%
11. Allow for expansion and contraction due to structural movement without detriment to appearance or performance.
12. System shall drain to exterior face of wall, water entering joints and condensation occurring within the system.
13. Provide concealed fasteners.
14. Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of architect.
15. Use manufacturer's recommended interior and exterior gaskets to maintain adequate compression on glazing materials
16. Provide uniform color and profile appearance at components exposed to view.
17. Provide entrances and storefront systems and components engineered by registered professional engineers, licensed to practice structural engineering in jurisdiction where Project is located. Coordinate work to provide continuous, exterior skin assembly, complying with specified performance requirements for air and water infiltration, including at intersections and transitions between adjacent systems.
18. Not Permitted: vibration harmonics, rattles, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
19. Do not design the entrances and storefront system to exceed sealant manufacturer's recommended performance criteria.
20. Aluminum brake metal trims shall be a minimum .080-inch thick.
21. Glazed aluminum entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads without negative impact to entrances and storefront design functions.

**1.4 ACTION SUBMITTALS**

A. Product Data: For each type of product indicated. Include method of erection, construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include technical data including test reports for the type of glazed entrances and storefronts proposed, glazing units, sealants, and other related manufacturer products required which certify that the system meets the specified performance requirements.

B. Installation Instructions:
   1. Submit entrances and storefront system manufacturer's installations instruction.

C. Shop Drawings: Submit shop drawings of entrances and storefront system sealed by Engineer registered in the State of Texas for city approval. Shop drawings shall include layouts and full-size details for all work covered under this section, showing actual dimension and thickness, sizes and shapes of members, connection system, flashing and weep system, condensation control system, methods of joining components for field assembly and connection to abutting construction, as well as, field re-glazing details and procedures.
   1. Shop drawings shall show the relationship of all components of the exterior wall system in each drawing including thermal insulation, sealants backer rods, setting blocks, edge blocks and spacers.
   2. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.
   3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
   4. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   5. Include full-size isometric details of each vertical-to-horizontal intersection of entrances and storefronts, showing the following:
      a. Joinery, including concealed welds.
      b. Anchorage.
      c. Expansion provisions.
      d. Glazing.
      e. Flashing and drainage.

D. Samples for Initial Selection: For units with factory-applied color finishes provide color samples from the manufacturer's full range.

E. Submit samples of each type of glass, 12 x 12 inch size.

F. Test Reports:
   1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.

G. Qualification Data: For qualified Installer and testing agency.

H. Delegated-Design Submittal: For entrances and storefront walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

I. Submit Manufacturer printed installation instructions.

**1.5 INFORMATIONAL SUBMITTALS**

A. Product test reports.

B. Field quality-control reports.

C. Sample warranties.

**1.6 CLOSEOUT SUBMITTALS**

A. Maintenance data.

**1.7 QUALITY ASSURANCE**

A. Fabricator Qualifications: An entity that employs fabricators and supervisors who are trained and approved by manufacturer. Storefront fabricator shall have a minimum of 10 years' experience in erection of this type of system.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer. Entrances and storefront installer shall have a minimum of 10 years' experience in erection of this type of system.

C. Single Source Responsibility: Provide glazed entrances and storefront systems from one source from a single manufacturer.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. 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.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

**1.8 PERFORMANCE REQUIREMENTS**

A. Delegated Design: Design glazed entrances and storefronts, including comprehensive engineering analysis by a qualified professional engineer, registered in the State of Texas, using performance requirements and design criteria indicated.

B. General Performance: Comply with performance requirements specified, as determined by testing of entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Glazed aluminum entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.
      f. Sealant failure.
      g. Damage to or failure of glazing, framing members, and/or structural connections.
      h. Deflection exceeding specified limits.

C. Structural Loads:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to **13 feet 6 inches** and to 1/240 of clear span plus **1/4 inch** for spans greater than **13 feet 6 inches** or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
   2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than **1/8 inch**.
      a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
   3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
   1. Fixed Framing and Glass Area:
      a. Maximum air leakage of 0.06 CFM/sq.ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
   1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft..

G. Energy Performance: Certify and label energy performance according to NFRC as follows:
   1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.56 Btu/sq. ft. x h x deg F] as determined according to NFRC 100.
   2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.35 as determined according to NFRC 200.
   3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.

H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

I. Testing Requirements: Provide components that have been previously tested by an independent testing laboratory.

**1.9 DELIVERY, STORAGE, AND HANDLING**

A. All components of the wall shall be identified after fabrication by marks clearly indicating their location on the building. Packaging, if necessary, shall be the minimum necessary to protect the parts from damage during shipping and hoisting.

B. Storage areas shall be on the site and as designated by the Owner. Contractor shall provide protection required, so that the stored materials will not exposed to damage from wetting, traffic or operations of other trades.

C. Provide wrapping, strippable coating to protect pre-finished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. These protective finishes can be removed and replaced with plastic compressible membrane protection at sills following completion of work at each floor.

**1.10 WARRANTY**

A. Special Assembly Warranty: Installer agrees to repair or replace components of glazed aluminum storefront that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: 10 years for anodized finish, 20 years FOR Kynar finishes from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. OldCastle BuildingEnvelope; FG3000T
   2. Kawneer North America; an Alcoa company; Trifab 451T
   3. YKK AP America Inc.; YES 45 TU
   4. Tubelite Inc,; 14000 Series “Thermally Broken”
   5. EFCO Corporation; 403T
   6. Substitutions with architects approval.

**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. Sizes and minimum gages as required, that will fulfill performance requirements but not less than 0.040 in. Suitable alloy and proper temper for forming and fabricating with adequate structural characteristics and suitable for finishing as specified.
   2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221. Bars, rods and shapes as required of thicknesses that will fulfill performance requirements and of suitable alloy and proper temper for extruding and fabricating with adequate structural characteristics and suitable for finishing as specified.
   3. Extruded Structural Pipe and Tubes: ASTM B 429.
   4. Structural Profiles: ASTM B 308/B 308M.
   5. Stainless Steel Plates, Bars, and Shapes: ASTM A167 and A276, AISI Type 302 or 304 alloy.
   6. Steel Reinforcement: With corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 or manufacturer’s standard two-coat standard shop-applied zinc primer applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPCSP COM and prepare surfaces according to applicable SSPC standard.
      a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
      b. Cold-Rolled Sheet and Strip: ASTM A 611.
      c. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.
      d. Steel Welding Electrode: E70XX

**2.3 FRAMING**

A. Framing Members: Manufacturer's standard extruded- aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Framing shall be designed so that vision glass can be removed and reinstalled from the exterior side of the building.
   2. Construction: Internally drained system with condensation drainage, thermally broken.
   3. Glazing System: Retained mechanically with gaskets on four sides.
   4. Glazing Plane: Center.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
1. All fasteners exposed to the exterior elements shall be 300 series stainless steel.
2. Screws 1/4" diameter and smaller shall be 18-8 grade or 300 series stainless steel.
3. Bolts larger than 1/4" diameter that are exposed to the exterior elements shall be equal to ASTM F593, Group 1, Condition CW (Fy = 65 ksi).
4. Structural bolts located in interior or protected locations shall be equal to SAE J 429, Grade 8.
5. Structural high tensile tee-bolts provided shall be equal to ASTM F568, Grade 8.8
6. Structural steel bolts, nuts, and washers shall receive a mechanically galvanized finish per ASTM B695, class 65, type 1.
7. Post installed concrete anchors at protected or interior locations shall be equal to hardened 1020/1040 carbon steel with an electroplated zinc finish per ASTM B 633, SC1, Type III. Post installed concrete anchors shall have a 4:1 safety factor. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
8. Reinforce members as required to receive fastener threads.
9. Shims where required shall be high density polyethylene shims.
10. Slip pads and separators shall be 1/16” thick Nylatron.
11. Separation of Dissimilar Metals: Provide adequate separation between dissimilar metals to prevent galvanic corrosion. Separation shall be provided by suitable high density rigid plastics or similar materials and should not be by paint coatings. Aluminum surfaces that come into contact with hot-dipped galvanized finishes need not be separated if not exposed to the exterior elements.
12. Provide epoxy coating or high-density polyethylene sheet for separation of aluminum from alkali containing materials.

D. Anchors: Anchors tying the glazed aluminum Storefront system back to the building structure shall be constructed and installed in such a way as to not intrude into or be visible from the tenant lease space. Costs arising from anchor installations that require redesign and field or plan modification of the building framing and structure will be borne by this Contractor.
1. All fastener and anchors must accommodate movements resulting from thermal and building movements without detrimental impact to glazing system or building materials.

E. Embeds and Inserts:
1. Hot-rolled carbon steel inserts cast into the structure shall be designed with a 3:1 safety factor.
2. Headed steel stud anchors (ASTM A108) and/or deformed bar anchors (ASTM A496, ASTM A706) shall be designed with Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials 2:1 safety factor.

F. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials.
G. Framing Sealants: Manufacturer's standard sealants.
H. Glazing gaskets:
1. Compression type design, replaceable molded or extruded, of ethylene propylene diene monomer (EPDM) or silicone.
2. Profile hardness as required to maintain uniform pressure for watertight seal.

I. Weather-stripping:
1. Wool pile conforming to AAM 701.2.
2. Provide EPDM or vinyl blade gasket weather-stripping in bottom door rail, adjustable for contact with Threshold.

J. Internal sealant and baffles.

## 2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: **1-3/4-inch** overall thickness, with minimum **0.125-inch** thick, extruded- aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile; **5-inch** nominal width with 10-inch bottom rail.
3. Glazing Stops and Gaskets: **Square**, snap-on, extruded-aluminum stops and preformed gaskets.
a. Provide nonremovable glazing stops on outside of door.

## 2.5 ENTRANCE DOOR FABRICATION

A. Entrance Doors:
   1. Fabricate with mechanical joints using internal [steel] reinforcing plates and shear blocks attached with fasteners and by welding.
   2. Provide extruded aluminum glazing stops of square design, permanently anchored on security side and removable on opposite side.

B. Hardware:
   1. Receive hardware supplied and install in accordance with requirements of this Section.
   2. Cut, reinforce, drill and tap frames and doors as required to receive hardware.
   3. Comply with hardware manufacturer's templates and instructions.
   4. Use concealed fasteners wherever possible.

## 2.6 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in [Section 087100 "Door Hardware."] [Section 087111 "Door Hardware (Descriptive Specification)."]

B. General: Provide entrance door hardware[ and entrance door hardware sets indicated in door and frame schedule][ and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article] for each entrance door to comply with requirements in this Section.
   1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and [named manufacturers' products] [products equivalent in function and comparable in quality to named products] [products complying with BHMA standard referenced].
   2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
   3. Opening-Force Requirements:
      a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbfto set the door in motion[ **and not more than 15 lbf to open the door to its minimum required width**].
      b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
   1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
   2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Pivot Hinges: BHMA A156.4, Grade 1.
   1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.

E. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

F. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

G. Manual Flush Bolts: BHMA A156.16, Grade 1.

H. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

I. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

J. Cylinders: [As specified in Section 087100 "Door Hardware."] [As specified in Section 087111 "Door Hardware (Descriptive Specification)."] [BHMA A156.5, Grade 1.]
   1. Keying: Coordinate with owner.

K. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

L. Operating Trim: BHMA A156.6.

M. Removable Mullions: BHMA A156.3, extruded aluminum.
   1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

N. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

O. Concealed Overhead Holders: BHMA A156.8, Grade 1.

P. Surface-Mounted Holders: BHMA A156.16, Grade 1.

Q. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

R. Weather Stripping: Manufacturer's standard replaceable components.
S. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
T. Silencers: BHMA A156.16, Grade 1.
U. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.
V. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

## 2.7 GLAZING

1. Glazing: Comply with Division 088000 Glazing.

## 2.8 FABRICATION

A. Coordination of Fabrication:
   1. Check actual frame or door openings required in the construction work by accurate field measurements before fabrication.
   2. Fabricate units to withstand loads that will be applied when system is in place.
B. Form or extrude aluminum shapes before finishing.
C. Reinforce work as necessary for performance requirements, and for support to structure.
D. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators, which will prevent contact and corrosion.
E. 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.
F. 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. For thermally broken systems, physical and thermal isolation of interior and exterior aluminum shapes.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from exterior.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   7. Reinforce internally with structural member as necessary to support design loads.
   8. Provide flashing and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
   9. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
   10. Seal horizontals and direct moisture accumulation to exterior.
   11. Provide manufacturer’s extrusions and accessories to accommodate expansion and contraction due to temperature changes without detrimental to appearance or performance.
G. Welding:
   1. Comply with recommendation of the American Welding Society.
   2. Use recommended electrodes and methods to avoid distortion and discoloration.
   3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.
H. Flashings:
   1. Form from sheet aluminum with same finish as extruded sections. Apply finish after fabriacation. Material thickness as required to suit condition without deflection or “oil-canning”.
I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm] or thicker.
B. Color Anodic Finish: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm] [AA-M12C22A32/A34, Class II, 0.010 mm] or thicker.
   1. Color: [Light bronze] [Medium bronze] [Dark bronze] [Champagne] [Black] <Insert color>.
   2. Color: [Match Architect's sample] [As selected by Architect from full range of industry colors and color densities].
C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils.

1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

D. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with [**AAMA 2604**] [**AAMA 2605**] and containing not less than [**50**] [**70**] percent [**PVDF**] [**or**] [**FEVE**] resin by weight in color coat.
1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

E. High-Performance Organic Finish: [**Three**] [**Four**]-coat fluoropolymer finish complying with AAMA 2605 and containing not less than [**50**] [**70**] percent [**PVDF**] [**or**] [**FEVE**] resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.
2. EXECUTION

**2.10 STEEL FINISHES**

A. Steel components shall receive a hot-dipped galvanized finish per ASTM A123.
B. Steel components located in interior or protected locations shall receive a manufacturer’s standard two coat shop applied zinc primer.
C. Steel surfaces embedded into concrete that are not galvanized shall have a painted finish.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

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

**3.2 INSTALLATION**

A. General:
1. Install entrances and doors in accordance with manufacturer's written instructions.
2. Set units plumb, level and true to line, with warp or rack of frame.
3. Anchor securely in place, allowing for required movement, including expansion and contraction.
4. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weather-tight construction.
5. Coordinate installation of perimeter sealant and backing materials between assemblies and adjacent construction in accordance with requirements of Section 07920.
6. Do not install damaged components.
7. Fit joints to produce hairline joints free of burrs and distortion.
8. Rigidly secure nonmovement joints.
9. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
10. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
11. Seal joints watertight unless otherwise indicated.

B. Metal Protection:
1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum is in contact concrete or masonry, protect against corrosion or installing nonconductive spacers as recommended by manufacturer for this purpose.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum storefronts to exterior.
D. Install components plumb and true in alignment with established lines and grades.

**3.3 ADJUSTING**

A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer’s instructions to ensure smooth operation.

**3.4 ERECTION TOLERANCES**

A. Erection Tolerances: Install glazed aluminum entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).
   2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
      c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

**3.5 ANCHORAGE**

A. Anchorage of the storefront frames to the building structure shall be in accordance with the approved shop drawings. Anchors shall meet with requirements of this specification. After the wall is properly positioned all connections shall be secured as appropriate to meet performance requirements.
   1. Provide procedure on engineered submittals for tightening all bolts. Include load calibrating torque for all bolted connections. All bolted connections shall be checked and marked for proper tightening after installation. Tighten all fasteners to values required in engineered submittals. Once tightened/torqued, mark all such fasteners with a yellow spray paint mark to indicate that the proper tightening/torquing has been completed
   2. No portion of the storefront frame anchorage will intrude into or be visible from any portion of the tenant lease space when the installation is complete.

**3.6 SEALANT**

A. Install sealants as specified in Division 7, Section “Joint Sealants”.
B. Sealing materials specified in this specification shall be used in strict accordance with the Sealant manufacturers' printed instructions, and shall be applied only by workman specially trained or experienced in their use. Before applying sealant all mortar, dirt, dust, moisture and other foreign matter shall be completely removed from surfaces it will contact. Surfaces shall be cleaned per manufacturers recommendations. Adjoining surfaces shall be masked when required to maintain a clean and neat appearance. Primers shall be applied where required in accordance with the sealant Manufacturer's recommendations. Sealing compounds shall be tooled to fill the joint and provide smooth finished surface.

**3.7 FIELD QUALITY CONTROL**

A. Field testing and related inspections and reports and will be performed by a qualified independent testing and inspecting agency.
B. Coordination: Coordinate field testing of the storefront system with the testing agency so that testing is performed after the storefront system construction has been completed for each designated phase of completion but before installation of interior finishes has begun at each location. The storefront system contractor shall be responsible for providing a water supply of sufficient pressure and volume to meet the requirements of the field tests specified herein or in section 011900 at any location and height on the building from floor 1 through the top floor.
C. Testing Agency: The testing agency will be engaged by the Owner and Owner, Architect, and/or the Building Envelope Consultant will identify the location of the tests to be performed.
D. Testing Services: Testing and inspecting of representative areas of glazed aluminum storefront shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
   1. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 8.0 lbf/sq. ft., and shall not evidence “uncontrolled” water penetration.
      a. Test Area: Two bays in width, but not less than 10 feet, by one story of glazed aluminum storefront system including the perimeter joint
      b. Test Frequency: Perform tests in each test area as directed by Architect, Building Envelope Consultant, or Owner. Perform at least three tests, prior to 15, 50, and 90 percent completion.
   2. The tests shall be conducted in the presence of the Architect and/or the Exterior Wall Consultant at mutually selected areas of installed work. The typical test area shall be a minimum of two units in

width or 10 feet by the floor height so that a minimum of one vertical mullion and one intermediate horizontal (each side) are included in the specimen.

E. Glazed aluminum storefronts will be considered defective if they do not pass tests and inspections.
   1. Where water penetration occurs, make necessary modifications to the Work as approved by the Architect and/or Exterior Wall Consultant and retest. Continue the process until the work passes the test. Once deficiencies are correct in the tested work, make corrections to the balance of the work to ensure that all work complies with the performance criteria.
   2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

F. Provide test reports including documentation of remedial measures required to achieve passing test results for each test location.

**3.8 REMOVAL OF DEBRIS.**

A. All debris caused by or incidental to the installation work shall be promptly removed from the job site as the work progresses.

**3.9 PROTECTION AND CLEANING**

A. The entrances and storefront Contractor shall remove from the installed work all sealants, improperly placed or other unsightly marks caused by his workman, and shall be responsible for any damage to or disfigurement of the work caused at any time by his work.

B. Contractor shall protect the finished exterior wall from all welding damage or splatter to all exterior wall components whether from its own or others operations.

C. Provide protective measures as required throughout the remainder of construction period to ensure that the entrances and storefront work will be without damage or deterioration at the time of acceptance.

**3.10 MAINTENANCE**

A. Maintenance Manuals: Furnish complete manuals describing the materials, devices and procedures to be following in cleaning and maintaining the work, including re-glazing procedures. Include manufacturers' brochures and parts lists describing the actual materials used in the work, including metal alloys, finishes, sealants, gaskets and other major components. Assemble manuals for component parts into single binders identified for each system.

B. Maintenance Instruction: Instruct Owner's personnel who will be responsible for exterior washing after the time of final acceptance. Demonstrate and train Owner's personnel, for a period of not less than two working days, in the proper methods of cleaning and maintaining the entire exterior wall.

**END OF SECTION 084413**

## SECTION 084413.83 - REPLACEMENT ALUMINUM CURTAIN WALL

### PART 1 GENERAL

### 1.1 SUMMARY

A. This Section includes the following types of aluminum-framed glazed curtain walls installed in existing openings:
   1. Curtain walls including Glazing

B. Related Sections include the following:
   1. Section 020700 - Selective Demolition
   2. Section 079200 - Joint Sealants

### 1.2 PERFORMANCE REQUIREMENTS

A. Curtain Wall System Requirements: Provide aluminum curtain walls capable of complying with performance requirements indicated, based on testing manufacturer's curtain walls that are representative of those specified. The Work required under this section is the complete design, fabrication, and installation of new curtain wall units that are shop fabricated shipped knocked down (KD) shipped to the site, assembled and glazed in the field, Meet the following additional requirements.
   1. Delegated Design: Design aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer, registered in the State of Texas, using performance requirements and design criteria indicated.
   2. Wind Loads: Minimum design wind pressures for the work acting normal to the plane of the vertical surface of the aluminum curtain wall system of the building shall be as indicated based on the 2012 International Building Code. Wind load acting either inward (positive) or outward (negative).
      a. Structural Loads: Provide aluminum curtain walls capable of withstanding the following, including:
         1) Wind Design Pressure: -53 psf at corner zone and ± 29 psf for field zone.
         2) Wind Speed 136 (Risk Category II)
         3) Exposure B
      b. Deflection of Framing Members: Design glass framing system to meet the following requirements.
         1) Deflection Normal to Wall Plane: Limit lateral deflections of glass edges to less than L/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on structural computations.
         2) Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.
         3) Permanent Set: Main framing members shall have no permanent deformation in excess of 0.1 percent of their clear span.
            a) Air Infiltration: Provide curtain wall 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 6.24 lbf/sq. ft.
   3. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 12 lbf/sq. ft.
      a. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies normally exposed to the interior from sources other than condensation. No water penetration that results in the wetting of interior finishes including insulation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.
   4. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 12 lbf/sq. ft.
      a. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies normally exposed to the interior from sources other than condensation. No water penetration that results in the wetting of interior finishes including insulation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.

B. Energy Performance: Glazed aluminum curtain walls shall have certified and labeled energy performance ratings in accordance with NFRC.
   1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor as indicated within Section 011900 with the glass types provided within Section 088000.
   2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient as indicated within Section 011900 with the glass types provided within Section 088000.
   3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..

C. Thermal Movements: Provide aluminum curtain wall, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.
   a. Temperature Change (Range): 120 deg F, ambient; 180 deg Fmaterial surfaces.

D. Glazing Performance Requirements: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction. Meeting the following additional requirements.
   1. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
   2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
   3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
   4. Units within 36 Inches of Walking Surface: On full height insulated vision units and other units exposed to the interior within 36 inches of a walking surface, the in-board lite is to be tempered and heat soaked.
   5. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
      a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 1.3 SUBMITTALS

A. Curtain Wall System Product Test Reports: Based on evaluation of comprehensive tests performed within the last five years by a qualified testing agency, for each type, grade, and size of aluminum curtain wall. Test results based on use of down-sized test units will not be accepted for structural performance. Test results of up-sized test units will not be accepted for thermal performance.

B. Product Data:
   1. Curtain Wall System: For each type of product indicated, include method of erection, construction details, material descriptions, fabrication methods and procedures, installation instructions, dimensions of individual components and profiles, and finishes for each type of aluminum
   2. Glazing: Based on evaluation of comprehensive tests performed by a qualified testing agency, which certify that the proposed products meet the specified requirements.

C. Product Certificates: For each glass and glazing products from manufacturer.

D. Shop Drawings: Submit shop drawings of curtain wall system sealed by Engineer registered in the State of Texas for city approval. Shop drawings shall include layouts and full-size details for all work covered under this section, showing actual dimension and thickness, sizes and shapes of members, connection system, flashing and weep system, condensation control system, methods of joining components for field assembly and connection to abutting construction, as well as, field reglazing details and procedures.
   1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Actual anchoring fasteners
d. End reactions.
e. Expansion provisions.
f. Glazing.
g. Flashing and drainage.

3. Shop drawings shall show the relationship of all components of the exterior wall system in each drawing including thermal insulation, sealants backer rods, setting blocks, edge blocks and spacers.
4. Include curtain wall cleaning provisions.
5. Include re-glaze procedures.

E. Curtain Wall System Calculations: For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Samples for Initial Selection:
1. Curtain Wall System Finish: Full range of factory-applied color finishes.
2. Glazing: For each type of glass product other than clear monolithic vision glass; 12 inches square.

G. Qualification Data: For installer, professional engineer, manufacturer, and testing agency.

H. For shop-fabricated curtain wall systems, contractor to submit their shop and field quality control program in writing for review prior to commencement of Work. Provide written periodic quality-control reports for both shop and field work.

I. Preconstruction Sealant Compatibility and Adhesion Test Report: Submit the sealant manufacturer's compatibility and adhesion test report for all sealant substrates for the proposed system(s). Test report should indicate sealant type, surface preparation including primer, etc. for each substrate. For non-porous substrates, testing will not be required if joint-sealant manufacturer(s) submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, non-porous joint substrates and other materials matching those submitted.

J. Sealant Manufactures Letter of Review: Stating that the sealant manufacturer has reviewed the curtain wall shop drawings and finds the design acceptable.

K. Glass Manufacturers Letter of Review: Stating that the glass manufacturer has reviewed the curtain wall shop drawings and finds the design acceptable.

L. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

M. Maintenance Data: curtain wall system glazing replacement and cleaning included in maintenance manuals.

N. Warranties: Submit sample warranties in accordance with Part 1.6 Warranty within this Section.

## 1.4 QUALITY ASSURANCE

A. Installer Qualifications: An installer with a minimum of 10 years' experience in curtain wall installation, acceptable to aluminum curtain wall manufacturer for installation of units required for this Project. Provide installer's AAMA certification if available.

B. Manufacturer Qualifications:
1. Curtain Wall System: A manufacturer capable of fabricating aluminum curtain walls that meet or exceed performance requirements indicated and have documented this performance by certification, labeling, and inclusion in lists. Curtain Wall manufacturer shall have a minimum of 10 years' experience in fabrication of this type of system.
2. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

E. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with experience and capability to conduct testing indicated, as documented according to ASTM E 548. For glazing, a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

F. Source Limitations: Obtain aluminum curtain wall, storefronts, and doors through one source from a single manufacturer. Obtain insulating glass from single source from single manufacturer for each glass type. Obtain from single source from single manufacturer for each product and installation method.

G. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum curtain walls' 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.

H. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

I. Mockups: Build mockups to verify selections made under sample Submittals; to demonstrate aesthetic effects, performance, and qualities of materials and execution; and to perform air and water testing to verify that curtain wall system meets those performance requirements.
   1. Build mockup in building envelope wall in location shown on Drawings.
   2. Testing Methodology: Testing of mockup shall be performed in general conformance with AAMA 503. Test pressure to be 2/3 of that indicated Part 1 "Performance Requirements" Article, but not less than 8 psf.
   3. Test Reports: Shall be prepared in general accordance with AAMA 503.
   4. Repair mockup where test results indicate that it does not comply with specified requirements.
   5. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   6. Approved mockups may become part of completed Work if installed with final Project requirements.

J. Pre-installation Conference:
   1. Meet with Owner, Engineer, Owner's insurer if applicable, testing and inspecting agency representative, curtain wall installer, curtain wall system manufacturer's representative, and installers whose work interfaces with or affects curtain wall installation, including installers of door accessories and interior repair.
   2. Review methods and procedures related to curtain wall installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine substrate conditions and finishes for compliance and other preparatory work performed by other trades.
   5. Review governing regulations and requirements for insurance and certificates if applicable.
   6. Review required testing and inspecting procedures.

## 1.5 PROJECT CONDITIONS

A. Field Measurements: Verify aluminum curtain wall openings by field measurements before fabrication and indicate measurements on Shop Drawings.

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

## 1.6 WARRANTY

A. Special Assembly Warranty: Standard form in which Installer agrees to repair or replace components of glazed aluminum curtain walls 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. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: 10 years from date of Substantial Completion.
   3. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass 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.
   4. Warranty Period: 15 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 5 years from date of Substantial Completion.

D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which 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.
   2. Warranty Period: 10 years from date of Substantial Completion.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Curtain Wall Systems:
   1. All components of the wall shall be identified after fabrication by marks clearly indicating their location on the building. Packaging, if necessary, shall be the minimum necessary to protect the parts from damage during shipping and hoisting.
   2. Storage areas shall be as designated by the Owner. Contractor shall provide protection required, so that the stored materials will not exposed to damage from wetting, traffic or operations of other trades.
   3. Provide wrapping, strippable coating to protect pre-finished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

B. Glazing:

1. Protect glazing materials per manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
2. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

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

B. Curtain Wall System Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Acceptable manufacturer’s
      a. Kawneer, 1600 Wall (Basis of design)
      b. OldCastle, Reliance Wall
      c. EFCO, System 5600
      d. YKK, YCW 750

C. Glazing Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. PPG.
   2. Oldcastle.
   3. Viracon.

### 2.2 CURTAIN WALL SYSTEM MATERIALS, GENERAL

A. Aluminum Extrusions: Alloy and temper recommended by aluminum curtain wall manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psiultimate tensile strength, not less than 16,000-psi minimum yield strength, and not less than 0.062-inch thickness for main frame members.

B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum curtain wall members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
   1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inchthick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
   2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.

E. For sealants required within fabricated curtain wall, provide curtain wall manufacturer’s standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement. Provide internal seals at intersections of metal framing to maintain water-tight construction.

F. Aluminum trim metal: Provide interior stool trim to match the profile of the existing curtain wall system. Color to match new aluminum curtain wall framing.

G. Metal protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with painted coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

## 2.3 GLASS AND GLAZING

A. Thickness: Provide glass lites in thicknesses as needed to comply with requirements indicated. Thickness as indicated by designations in millimeters according to ASTM C 1036.
   1. Minimum Glass Thickness: Not less than 6.0 mm.
   2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

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. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
   2. For laminated-glass lites, properties are based on products of construction indicated.
   3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   4. 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.
   5. 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.
   6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.4 GLASS PRODUCTS

A. Glazing Types by System:
   1. Fabricated exterior-Set curtain wall opening: Comply with applicable requirements as indicated by designations in "Insulating-Glass Units" Article.

B. HEAT-TREATED FLOAT GLASS: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
   2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with wind load requirements.
   3. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.
   4. For uncoated glass, comply with requirements for Condition A.
   5. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Uncoated Tinted Float Glass: Class 2, complying with other requirements specified.

## 2.5 INSULATING-GLASS UNITS

A. Glass Make-Up (Basis of Design): Glass unit make-up is based on the following Viracon product.
   1. GL-1 VNE 24-63
      a. ¼” Optiwhite HS VNE-63 Low-E #2
      b. ½” Airspace mill aluminum spacer
      c. ¼” Optiwhite HS
   2. GL-1S
      a. 1/4” Clear HS VNE 1-63 Low-E #2
      b. 1/2” Airspace mill aluminum Spacer
      c. 1/4” Clear HS w/V907 Black #4

B. Supply glass of type and quality specified herein. Design glass in accordance with ASTM E1300 for selection of appropriate glass thickness and type of glass.

C. Glass Sizes: Obtain sizes from shop drawings. Cut glass to fit opening with not less than minimum edge clearances and bite on glass as recommended by glass manufacturer. Provide glass with "clean-cut" edges.

D. Safety Glazing Materials shall conform to ANSI Z97.1 (Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings) and CPSC 16 CFR 1201 (Consumer Product Safety Commission Standard on Architectural Glazing Materials).
   1. Safety glazing materials shall be installed where required by governing Codes.
   2. Tempered glass shall be used in all locations.

## 2.6 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
   1. EPDM complying with ASTM C509 or C864.
   2. Silicone complying with ASTM C1115

B. Except for outside glazed systems, all curtain wall glazing gaskets are to have factory molded corners inside and out and are to be shipped to the destination in frames. Gasket lengths are to be factory sized for the recommended crowd-in to prevent shrinkage away from the corners.

## 2.7 GLAZING SEALANTS

A. General:
   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
      a. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## 2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: EPDM or silicone with a Shore, Type A durometer hardness of 85, plus or minus 5. Silicone only adjacent to laminated or structural silicone glazing.

D. Spacers: EPDM or silicone blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: EPDM or silicone of hardness needed to limit glass lateral movement (side walking).

F. 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.

G. Setting blocks, edge blocks and spacers shall be installed in accordance with glass manufacturer’s and GANA “Glazing Manual”.

## 2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

## 2.10 CURTAIN WALL SYSTEM FABRICATION

A. General: Provide complete system for assembling components and anchoring curtain walls. Fabricate components that, when assembled, have the following characteristics:
   1. Fabricate aluminum curtain walls that are re-glazed from the exterior without dismantling adjacent finishes.
   2. System Drainage
      a. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
      b. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
      c. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
   3. Form or extrude aluminum shapes before finishing.
   4. Fabricate components that, when assembled, have the following characteristics:
   5. Profiles that are sharp, straight, and free of defects or deformations.
   6. Accurately fitted joints with ends coped or mitered.
   7. For thermally broken systems, physical and thermal isolation of glazing from framing members.
   8. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   9. Minimum clearance and shim spacing around perimeter of assembly, yet enabling installation.
   10. Provisions for safety railings mounted [between mullions at interior].
   11. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Welding: Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

## 2.11 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with system established by Aluminum Association for designating aluminum finishes.

C. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

D. Color: Dark bronze

## PART 3 EXECUTION

### 3.1 SITE INSPECTION

A. Prior to commencing Work, examine surfaces to receive Work and verify dimensions. Commencing Work constitutes acceptance of Work surfaces and conditions.

B. Repair of Damaged Concrete: Choose all repair products from one manufacturer.
   1. Contractor shall use cation not to damage the existing reinforcing steel or post tensioned cables.
   2. Use caution when saw cutting around the edges of spalls not to cut reinforcing bars.
   3. All areas that will require drilling (for example drilling for curtain wall perimeter fasteners) shall be scanned using GPR or Pacometer and location of all rebar and post tension cable shall be clearly marked on the surface concrete with a hi-visibility paint.
   4. Use extreme caution working around post tensioned cables. If location of PT cables conflicts with a recommended repair, contact engineer of record.

C. Curtain Wall System: Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; operational clearances and other conditions affecting performance of work.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
      a. Advise General Contractor of all masonry damage. General contractor to perform repairs within 48 hours of notification. Repairs are to be performed in accordance with the manufacturers recommendations and instructions prior to installation of any curtain wall system components.
      b. Any masonry damage found that requires repairs after curtain wall is installed will be paid for by curtain wall contractor.
   2. Metal Frame Walls: Well secured, dry, clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints. Ensure that wood blocking is secured with countersunk fasteners to metal frame so that fasteners do not extend into opening.
   3. Elastomeric Coatings: Visibly smooth and free from pin holes, crack, gaps, and blisters.
      a. Advise General Contractor all Elastomeric Coatings damage. General contractor to perform repairs within 48 hour of notification. should be performed 48 hours in advance in accordance with the manufacturers recommendations and instructions prior to installation of curtain wall system.
      b. Any Elastomeric Coating damage found that requires repairs after curtain wall is installed will be paid for by curtain wall contractor.

D. Glazing: Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 GLAZING INSTALLATION

A. PREPARATION
   1. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
   2. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

B. GLAZING, GENERAL
   1. 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.

2. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
3. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement; weeps are clear, and ready to receive glazing.
4. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
5. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
6. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications and as required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
7. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
8. Provide spacers for glass lites where length plus width is larger than 50 inches.
    a. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
    b. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
9. 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 per requirements in referenced glazing publications.
10. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
11. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
12. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
13. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.3 CURTAIN WALL SYSTEM INSTALLATION

A. General: Comply with manufacturer's written instructions for installing curtain walls, hardware, accessories, and other components; Drawings; and Shop Drawings. Meet the following requirements.
    1. Do not install damaged components.
    2. Fit joints to produce hairline joints free of burrs and distortion.
    3. Rigidly secure non-movement joints.
    4. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
    5. Seal joints watertight unless otherwise indicated.

B. Install curtain wall level, plumb, square, true to line, without distortion or impeding thermal movement and anchor securely in place to structural support from the interior of the building only.

C. Install curtain wall and components to drain condensation, water penetrating joints, and moisture migrating within curtain wall harmlessly to exterior.

D. Metal Protection: Separate steel, aluminum, and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in 2.2, G. Metal Protection specified herein.

E. Anchorage of the curtain wall frames to the building structure shall be in accordance with the approved shop drawings. Anchors shall meet with requirements of this specification. After the wall is properly positioned all connections shall be secured as appropriate to meet performance requirements.
    1. Provide procedure on engineered submittals for tightening all bolts. Include load calibrating torque for all bolted connections. All bolted connections shall be checked and marked for proper tightening after installation. Tighten all fasteners to values required in engineered submittals. Once tight-

ened/torqued, mark all such fasteners with a yellow spray paint mark to indicate that the proper tightening/torquing has been completed

2. No portion of the curtain wall frame anchorage will intrude into or be visible from any portion of the tenant lease space when the installation is complete

### 3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).
   2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
      c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length

### 3.5 CURTAIN WALL SYSTEM FIELD QUALITY CONTROL

A. Field testing and related inspections and reports and will be performed by a qualified independent testing and inspecting agency.

B. Coordination: Coordinate field testing of the curtain wall system with the testing agency so that testing is performed after the curtain wall system construction has been completed for each designated phase of completion but before installation of interior finishes has begun at each location. The curtain wall system contractor shall be responsible for providing a water supply of sufficient pressure and volume to meet the requirements of the field tests specified herein or in section 011900 at any location and height on the building from floor 1 through the top floor.

C. Testing Agency: The testing agency will be engaged by the Owner and Owner, Architect, and/or the Building Envelope Consultant will identify the location of the tests to be performed.

D. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
   1. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 8.0 lbf/sq. ft., and shall not evidence “uncontrolled” water penetration.
      a. Test Area: Two units in width, but not less than 10 feet (), by one story of glazed aluminum curtain wall including stack joints if present.
      b. Test Frequency: Perform tests in each test area as directed by Architect, Building Envelope Consultant, or Owner. Perform at least three tests, prior to 10, 35, and 70 percent completion.

E. The tests shall be conducted in the presence of the Architect and/or the Exterior Wall Consultant at mutually selected areas of installed work. The typical test area shall be a minimum of two units in width or 10 feet by the floor height so that a minimum of one vertical mullion and one intermediate horizontal (each side) are included in the specimen.

F. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
   1. Where water penetration occurs, make necessary modifications to the Work as approved by the Architect and/or Exterior Wall Consultant and retest. Continue the process until the work passes the test. Once deficiencies are correct in the tested work, make corrections to the balance of the work to ensure that all work complies with the performance criteria.
   2. Additional testing and inspecting, at Contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. Provide test reports including documentation of remedial measures required to achieve passing test results for each test location.

## 3.6 PROTECTION AND CLEANING

A. The Curtain Wall Contractor shall remove from the installed work all sealants, improperly placed or other unsightly marks caused by his workman, and shall be responsible for any damage to or disfigurement of the work caused at any time by his work.

B. Contractor shall protect the finished exterior wall from all welding damage or splatter to all exterior wall components whether from its own or others operations

C. Provide protective measures as required throughout the remainder of construction period to ensure that the curtain wall work will be without damage or deterioration at the time of acceptance.

D. Glazing:
1. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
2. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
3. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
4. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
5. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

## 3.7 MAINTENANCE

A. Maintenance Manuals: Furnish complete manuals describing the materials, devices and procedures in cleaning, adjusting, and maintaining the work, including door hardware adjustments and re-glazing procedures. Include manufacturers' brochures and parts lists describing the actual materials used in the work, including metal alloys, finishes, sealants, gaskets and other major components. Assemble manuals for component parts into single binders identified for each system.

B. Maintenance Instruction: Instruct Owner's personnel who will be responsible for exterior washing after the time of final acceptance. Demonstrate and train Owner's personnel, for a period of not less than two working days, in the proper methods of cleaning and maintaining the entire exterior wall.

END OF SECTION

**SECTION 084610 - AUTOMATIC SLIDING DOORS**

# PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Automatic Sliding Doors and Sidelights.
- B. Operators and Control Devices for Automatic Sliding Doors.
- C. Automatic Telescopic Sliding Door System.
- D. Operators and Control Devices for Automatic Telescopic Sliding Doors.

1.2 RELATED SECTIONS
- A. Section 079200 - Caulking
- B. Section 08411300 - Entrances and Storefronts: Aluminum doors and frames.
- C. Section 088000 - Glass & Glazing: General glazing requirements.

1.3 REFERENCES
- A. ANSI A117.1 - American National Standard for Accessible and Useable Buildings and Facilities.
- B. ANSI A156.10 - Power Operated Pedestrian Doors.
- C. ANSI-Z97.1.2 - Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.
- D. ASTM A 36 / A36 M - Standard Specification for Carbon Structural Steel.
- E. ASTM A 924 / A 924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- F. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- G. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- H. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- I. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls By Uniform Static Air Pressure Difference.
- J. ASTM F 842 - Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact.
- K. Aluminum Association Standard AA DAF-45 - Designation System for Aluminum Finishes.
- L. PA 202-94 - Uniform Static Pressure Test. Dade County Code Compliance Protocols.
- M. PA 203-94 - Cyclic Wind Pressure Loading Test. Dade County Code Compliance Protocols.
- N. NFPA 70 – National Electric Code.
- O. NFPA 101 – Life Safety Code.
- P. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems - (UL) listed.

1.4 DESIGN / PERFORMANCE REQUIREMENTS
- A. Accessibility Requirements: Comply with requirements of Local building code, and Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities.
- B. System Design: Operate, hold open, and close doors under design wind and suction loads calculated in accordance with applicable building code.
- C. Operating Temperature Range: Minus 35 to plus 130 degrees F (minus 37 to plus 55 degrees C) ambient.
- D. Operators: Fully adjustable for opening and closing speeds, checking speeds, hold open time, and cancellation on activation of fire alarm and smoke detection system.
- E. Electrical: 120 VAC, 60 Hz, 5 Amp service provided to the header.

1.5 SUBMITTALS
- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  1. Preparation instructions and recommendations.
  2. Storage and handling requirements and recommendations.
  3. Installation methods.
  4. Operation and maintenance data.

C. Shop Drawings: Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, adjacent construction interface, recesses, materials, and finishes, electrical characteristics and connection requirements.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
G. Manufacturers warranties.
H. Contract Closeout: Submit
    1. As-Built Record Documents showing actual installation conditions and wiring.
    2. Manufacturer’s Warranty.
    3. Parts lists and maintenance instructions including data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
    4. American Association of Automatic Door Manufacturers (AAADM) inspection form completed and signed by certified AAADM inspector prior to doors being placed into operation.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer to have minimum five years documented experience in the fabrication of automatic doors of the type required for this project and be capable of providing field service representation during installation.
B. Installer Qualifications: Installer to be experienced in the work of this section who has specialized in the installation of work similar to that required for this project.
C. Certified Inspector: Copy of current AAADM Certification for AAADM inspector prior inspection.
D. Mock-Up: Provide a mock-up for evaluation of installation techniques and application workmanship.
    1. Finish areas designated by Architect.
    2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
    3. Refinish mock-up area as required to produce acceptable work.
    4. Accepted mock-up may become part of the Work.
E. Automatic sliding door system shall be certified by the manufacturer to meet performance design criteria according to the following test standards: [select, if applicable]:
    1. ANSI A156.10.
    2. NFPA 101.
    3. Underwriter’s Laboratories 325 (UL) listed.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Package hardware items individually with necessary fasteners and installation templates when necessary; label and identify each package with door opening code to match door schedule.
B. Store products in manufacturer's unopened packaging until ready for installation.
C. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
D. Store materials in a dry, warm, ventilated weathertight location.

1.8 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 MAINTENANCE MATERIALS
A. Provide special wrenches and tools applicable to each different or special hardware component.

1.10 COORDINATION
A. Coordinate work with other directly affected components involving manufacture or fabrication of reinforcement for door hardware and recessed items.

B. Coordinate work with other directly affected components involving electrical wiring and components.

## PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: DORMA Automatics, Inc.; 924 Sherwood Drive, Lake Bluff, Illinois 60044. ASD. Toll Free: 1-877-367-621.1 Fax: 1-877-423-7999. Web: www.dorma-usa.com. E-Mail: automatics@dorma-usa.com.
B. Substitutions: Not permitted.
C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 COMPONENTS

A. Extruded Aluminum: ASTM B 221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
B. Sheet Aluminum: ASTM B 209, 5005 alloy, H15 or H34 temper.
C. Sheet Steel: ASTM A 924/A 924M; galvanized to minimum G90.
D. Steel Sections: ASTM A 36/A3 6M; shaped to suit mullion sections, galvanized.
E. Glass: Glass shall be in accordance with Safety Glazing standard ANSI-Z97.1.2.
    1. Single pane of fully tempered select glazing quality clear float glass, safety glass, minimum 1/4 inch (6 mm) thick, conforming with requirements in Section 08800 - Glazing.
    2. Single pane of laminated glass, minimum 1/4 inch (6 mm) thick laminated glass.
    3. Sealed double pane units, consisting of fully tempered select glazing quality clear float glass, safety glass, total thickness 1 inch (25 mm), conforming with requirements in Section 08800 - Glazing.
F. Glazing Materials: Entrance manufacturer's standard types to suit application and conforming with requirements specified in Section 08800.
G. Weatherstripping: Entrance manufacturer's standard types to suit application.
H. Fasteners: Stainless steel or corrosion resistant steel.

2.3 AUTOMATIC SLIDING DOOR SYSTEM

A. Automatic Sliding Door System: DORMA ESA300 (full breakout design) consists of aluminum door(s) with sidelite(s). Door opening restrictor arms shall be provided for all panels to control and limit the opening angle of the door(s) as they swing in the direction of egress. Provide to dimension heights and widths indicated on the Drawings.
    1. Sliding Aluminum Doors:
        a. Narrow stile.
        b. Medium stile.
        c. Glazing 1/4 inch (6 mm) tempered glass.
        d. Glazing 1 inch (25 mm) tempered glass.
        e. Intermediate muntin 3.25 inches (83 mm) including glass stops.
        f. Bottom rail 7.5 inches (190.5 mm) including glass stops.
        g. Bi-part sliding door system includes a two-point lock: one secured at the lead edge(s) of the door panel(s) and the other to the carrier assembly above the locking stile.
        h. Door package includes interlock clips that latch the sliding panel(s) to the sidelite panel(s) when the door system is in the fully closed position.
        i. Active sliding door provided with a maximum security hookbolt lock, with provisions for a key cylinder on the exterior and a thumb turn on the interior in accordance with NFPA 101.
        j. Exit Device: Adams Rite Model 8600 narrow stile concealed vertical rod exit device.
        k. Autolock: Conceal carrier lock, head mounted.
    2. Door Operation: Slide panel(s) shall slide open and position to provide egress at any point in the door's movement or position in compliance with NFPA 101.
        a. Single slide.
        b. Bi-part slide.
        c. Slide panel(s) allow "breakout" to the full and open position providing egress at any point in the door's movement or position. Automatic operation is

discontinued when any panel is in the “breakout” mode by way of a non-contact cut-off switch, or self-closing device.

d. Size door(s) and sidelite(s) and positioned to provide a minimum 0.75 inch (19 mm) finger protection to prevent pinch points at the meeting stiles when fully opened.

e. Battery Back-Up: Provide emergency exit devices, automatic locking system, DORMA ITS-96 hydraulic door closers, with battery back-up system.

3. Aluminum Frame and Extrusions:
   a. Door panels 1.75 inches (44 mm) deep.
   b. Framing materials including jambs and header shall be 4.5 inches (114mm) deep.
   c. Structural sections shall be .125 inches thickness.
   d. Bi-part transom packages contain one vertical transom tube centered in the opening.
4. Sidelites:
   a. Provide sidelite door panel(s) to dimension height(s) and width(s) as indicated on the Drawings with corresponding glazing.
   b. Sidelites provided with standard intermediate 3.25 inch (82.5 mm) overall muntin.
   c. Sidelites shall swing out and allow the sliding doors to break away to the full open position for egress at any point in the door’s movement per NFPA 101.
5. Header: 4.5 inches wide by 7.5 inches high (114 mm wide by 190.5 mm high) with a minimal wall thickness of .125 inch (32 mm), capable of supporting door panels of 220 lbs. (100 kg) single slide or 190 lbs. (86 kg) bi-part slide.
   a. Header contains the door operator and door mounting components.
   b. Provide header cover with a continuous self-locking hinge design and open flush with the top of the header.
   c. Roller track shall be a separate extrusion from the header and sound dampened by separating the track from the header with an extruded EPDM rubber gasket.
   d. Operator components are factory assembled within the header. Minimal field wiring is required. Door functions provided in accordance with ANSI A156.10.
6. Door Hanger Wheels: 1.5 inches (38 mm) diameter Delrin wheels with self lubricating sealed ball bearing cores. Sliding door(s) stabilized on the track by 1.4 inches (36 mm) diameter anti-riser wheels. Assembly shall allow the sliding doors to freely swing outward for emergency egress. Door height shall have an upward or downward adjustment of 3/16 inches plus or minus (5 mm).
7. Threshold Track:
   a. Track is required adjacent to the Sidelites and panels.
   b. Provide with continuous threshold is available.
8. Door Operator and Controller: DORMA ESA system with an electro-mechanical operator and microprocessor controller. Components consist of a DC permanent magnet motor, a self lubricating drive system and a wear-free digital rotary encoder all linked to a fully integrated digital microprocessor controller.
9. Microprocessor Controller: DORMA microprocessor controller is a fully integrated digital design that is self-learning and self-monitoring.
   a. Performance parameters shall not exceed applicable ANSI A156.10 and/or UL standards.
   b. Controller shall continuously monitor all critical door functions and safety sensors.
   c. All door functions such as opening speed, closing speed, check locations, partial open dimensions, etc., shall be fully programmable without the use of limit switches by utilizing a portable hand terminal connected to the microprocessor controller.
10. Threshold Sensors: Self-monitored active infrared safety sensors. Sensors shall be self-contained and fully functioning during the opening and closing cycle of the door.
11. Activation Sensor: Motion sensor utilizes K-band frequency (24.125 GHz) for improved detection of slow-moving pedestrian traffic, and shall be switchable between bi-directional and uni-directional operation. Circuitry is included to eliminate Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI). Relay hold time is adjustable from 0.5 seconds to 9 seconds.

a. Mount motion sensor to the header at 120 inches (3,048 mm) maximum above the finished floor. Using the adjustable antenna the detection pattern is semi-circular.
b. When installed at a height of 96 inches (2,438mm) and set at the highest sensitivity, the sensor can provide a “wide pattern set-up “ of approximately 12 feet wide by 6 feet 6 inches deep (3,658 by 1,981 mm) or a “narrow pattern set-up“ of approximately 6 feet 6 inches wide by 8 feet deep (1,981 by 2,438 mm).
c. Location of the detection zone shall be adjustable by moving the antenna. Vertical antenna adjustments are possible from 0 degrees to 90 degrees in 15 degrees increments and lateral adjustment from 30 degrees left to 30 degrees right and anywhere in between.
d. Power is provided by the microprocessor control. Electrical adjustments can be made with a universal coded infrared remote control.

12. Accessories: ESA 300 automatic sliding door system shall include the following accessories to reduce energy loss:
a. Track-in pile weather-stripping on the bottom of sliding door(s).
b. Track-in double pile weather-stripping on the sliding door lead edges.
c. Track-in single pile weather-stripping between the carrier and the header on the sliding door(s).
d. Track-in double pile weather-stripping at the interlock rails between sliding door(s) and sidelite door(s).
e. Track-in neoprene weather-stripping between sidelite door(s) and jamb(s).
f. Track-in vinyl weatherstripping: For clean room applications, weather-stripping shall be Sanoprene.
g. Interior side jamb mounted program switches consisting of:
1) Main Switch = AUTO- CLOSE -OPEN (operates door in fully automatic mode or turns it off or keeps it fully open).
2) Exit Only Switch = OFF – ON (only the exit side motion detector will initiate door opening).
3) Partial Open Switch = OFF – ON (reduces the opening width according to weather and traffic conditions).

2.4 ELECTRICAL CHARACTERISTICS AND COMPONENTS
A. Section 16150 - Wiring Connections: Requirements for electrical characteristics.
B. Electrical: 120 VAC, 60 Hz, 5 Amp service.
C. Section 16225 - Motors: Requirements for motors, NEMA MG1.
D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

2.5 FACTORY FINISH
A. Provide aluminum finishes in accordance with Aluminum Association Standard AA DAF-45.
B. Clear Anodized Aluminum Surfaces: 204-R1 Class-II anodized aluminum coating.
C. Dark Bronze Color Anodized Aluminum Surfaces: 313-R1 Class-I Dark Bronze anodized aluminum coating.
D. Other Anodized Color: _____.
E. Painted Aluminum Surfaces: As fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
1. Organic Coating:
a. Manufacturer’s standard power coat finish.
b. Thermosetting modified acrylic enamel.
2. High Performance Organic Coating:
a. Fluoropolymer coating system with minimum 70 percent polyvinylidene fluoride resin.
3. Color:
a. As selected from manufacturer's standard range.
b. Custom color as selected by the Architect.
c. To match glazed aluminum curtain wall.

**PART 3 EXECUTION**

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. Verify that other trades are complete with their required work before installing the automatic swing door operating system.
C. Mounting surfaces shall be plumb, straight and secure; substrates shall be of proper dimension and material; material which door is anchored to shall be capable of supporting the automatic door system and associated loads.
D. Verify electric power is available and has correct characteristics.
E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Set all units plumb, level and secure.
C. Provide all fasteners required for installation of the automatic sliding door system.
D. After repeated operation of the completed installation, inspect door operators and controls for optimum operating condition and safety.
E. Adjust door equipment for correct function and smooth operation.
F. Clean all metal surfaces promptly after installation.
G. Remove temporary protection, clean exposed surfaces.

3.4 FIELD QUALITY CONTROL
A. Manufacturers representative to verify that installation of doors and controls are in conformance to the manufacturer’s recommendations.
B. Installation of doors and controls shall be inspected and certified by an AAADM Certified Inspector prior to doors being placed into operation.
C. Provide a completed AAADM inspection form signed by a certified AAADM inspector after the door system is completely installed and tested including glazing.

3.5 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 087100 - DOOR HARDWARE**

# PART 1 - GENERAL

## 1.1 SUMMARY

A. Section Includes**:**

1. Door hardware, including electric hardware.
2. Storefront and entrance door hardware.
3. Battery-powered electronic credential access control locks and panic hardware lever trim.
4. Card Access control system.
5. Hold-open closers with fire-alarm interface.
6. Wall or floor-mounted electromagnetic hold-open devices.
7. Power supplies for electric hardware.
8. Door position switches.
9. Cylinders for doors fabricated with locking hardware.
10. Point-to-point wiring diagrams for electric hardware.
11. Key cabinets.

B. Related Divisions**:**

1. Division 06 – door hardware installation
2. Division 07 – sealant at exterior thresholds
3. Division 08 – metal doors and frames, interior aluminum frames, wood doors, integrated security systems, specialty doors, storefront and glazed curtainwall systems.
4. Division 10 – operable partitions
5. Division 21 – fire and life safety systems
6. Division 28 – security access systems

C. Specific Omissions**:** Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.
8. Folding partitions, except cylinders where detailed. Sliding aluminum doors, except cylinders where detailed.
9. Access doors and panels, except cylinders where detailed.
10. Corner Guards.
11. Welded steel gates and supports.

## 1.2 REFERENCES**:**

A. Use date of standard in effect as of Bid date.

1. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
    a) ICC/ANSI A117.1 - 1998 – Specifications for making buildings and facilities usable by physically handicapped people.
    b) ANSI A156.18 Materials and Finishes
2. ADA – Americans with Disabilities Act of 1990 BHMA – Builders Hardware Manufacturers Association
3. DHI – Door and Hardware Institute
4. NFPA – National Fire Protection Association
    a) NFPA 80 – Fire Doors and Windows
    b) NFPA 105 – Smoke and Draft Control Door Assemblies
    c) NFPA 252 – Fire Tests of Door Assemblies
5. UL – Underwriters Laboratories

a) UL10C – Positive Pressure Fire Tests of Door Assemblies.
b) UL 305 – Panic Hardware

6. WHI – Warnock Hersey Incorporated
7. Local applicable codes
8. SDI – Steel Door Institute
9. WI – Woodwork Institute
10. AWI – Architectural Woodwork Institute
11. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations

1. Manufacturers**:** see table at 2.1.A of this section
2. Finishes**:** see 2.7 of this section.

1.3 SUBMITTALS & SUBSTITUTIONS

A. SUBMITTALS**:** Submit six copies of schedule per Section 01330. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information**:**

1. Type, style, function, size, quantity and finish of hardware items.
2. Use BHMA Finish codes per ANSI A156.18.
3. Name, part number and manufacturer of each item.
4. Fastenings and other pertinent information.
5. Location of hardware set coordinated with floor plans and door schedule.
6. Explanation of abbreviations, symbols, and codes contained in schedule.
7. Mounting locations for hardware.
8. Door and frame sizes, materials and degrees of swing.
9. List of manufacturers used and their nearest representative with address and phone number.
10. Catalog cuts.
11. Point-to-point wiring diagrams.
12. Manufacturer’s technical data and installation instructions for electronic hardware.
13. Date of jobsite visit.

B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
C. Deviations**:** Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.
D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
F. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, riser and point-to-point wiring diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

1.4 QUALITY ASSURANCE**:**

A. Qualifications**:**

1. Hardware supplier**:** direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.

a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

B. Hardware**:** Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

C. Exit Doors**:** Operable from inside with single motion without the use of a key or special knowledge or effort.

D. Fire-Rated Openings**:** NFPA 80 compliant. Hardware UL10C Standard 7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

1.5 DELIVERY, STORAGE AND HANDLING**:**

A. Delivery**:** coordinate delivery to appropriate locations (shop or field).

1. Permanent keys and cores**:** secured delivery direct to Owner's representative.

B. Acceptance at Site**:** Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.

C. Storage**:** Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION**:**

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

B. Coordination**:** Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information**:**

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
5. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
6. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
7. Manufacturers' templates to door and frame fabricators.

C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

D. Environmental considerations**:** segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

E. Prior to submittal, carefully inspect existing conditions to verify finish hardware required to complete Work, including sizes, quantities, existing hardware scheduled for re-use, and sill condition material. If conflict between the specified/scheduled hardware and existing conditions, submit request for direction from Architect. Include date of jobsite visit in the submittal.

1. Submittals prepared without thorough jobsite visit by qualified hardware expert will be rejected as non-compliant.

1.7 WARRANTY**:**

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties**:**

| | | |
|---|---|---|
| 1. | Exit Devices: | Three years mechanical<br>One year electrical |
| 2. | Closers: | Ten years mechanical |
| 3. | Hinges: | One year |
| 4. | Other Hardware | Two years |

1.8 COMMISSIONING:

A. Conduct these tests prior to request for certificate of substantial completion:

1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS:

A. Manufacturers and their abbreviations used in this schedule:

| | |
|---|---|
| IVE | H. B. Ives |
| LCN | LCN Closers |
| VON | Von Duprin |
| ZER | Zero International |

2.2 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.

1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

D. Continuous Hinges:

1. Geared-type aluminum.

a) Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.
b) If units are used at storefront openings, color-coordinate hinge finish with storefront color. Custom anodizing and custom powdercoat finishes subject to Architect approval.

2.3 EXIT DEVICES / PANIC HARDWARE

A. General features:

1. Independent lab-tested 1,000,000 cycles.

2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. Deadlocking latchbolts, 0.75 inch projection.
4. End caps**:** impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 15-pound maximum operating force, and with 32-pound maximum pressure under 250-pound load to the door.
8. Exterior doors scheduled with XP-series devices**:** Static load force resistance of at least 2000 pounds.

B. Specific features**:**

1. Non-Fire Rated Devices**:** cylinder dogging.
2. Lever Trim**:** breakaway type, forged brass or bronze escutcheon min. 0.130 inch thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
4. Fire-Labeled Devices**:** UL label indicating “Fire Exit Hardware”. Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. Inpact recessed devices**:** 1.25 inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
6. Delayed Egress Devices**:** Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 “Special Locking Arrangement” compliant.
7. Electrically Operated Devices**:** Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
8. Removable Mullions**:** Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.
9. Scheduled Manufacturer: Von Duprin 33A/99 Series (Match Owner’s Standard

## 2.4 POWER TRANSFERS

A. Provide Von Duprin EPT power transfers with swiveling stainless steel tube at all electrified locks and exit devices. Von Duprin EPT shall be used at all exits that require a high amp inrush to retract latch. Power transfer hinges or coiled spring power transfers will not be acceptable.
B. Provide Allegion Connect connectors as scheduled, at all electrified door hardware in type and lengths required to connect to power supply.

## 2.5 CLOSERS

A. Surface Closers**:**

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
4. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
5. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
6. Extra-duty arms (EDA) solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers with parallel arm units at doors scheduled with parallel arm units.

7. Exterior door closers**:** tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
8. Exterior doors**:** seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
9. Non-flaming fluid, will not fuel door or floor covering fires.
10. Pressure Relief Valves (PRV) not permitted.
11. Scheduled Manufacturer: LCN 4040XP

2.6 OTHER HARDWARE

A. Automatic Flush Bolts**:** Low operating force design.
B. Overhead Stops**:** Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
C. Kick Plates**:** Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
D. Door Stops**:** Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.

E. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum**:** 90deg stop / 95deg deadstop. Note degree of opening in submittal.
F. Seals**:** Adhesive type at head & jambs. Inelastic, rigid back, not subject to stretching. Self-compensating for warp, thermal bow, door settling, and out-of-plumb. Adhesive warranted for life of installation.

1. Proposed substitutions**:** submit for approval.

G. Automatic door bottoms**:** low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
H. Thresholds**:** As scheduled and per details. Substitute products**:** certify that the products equal or exceed specified material's thickness. Proposed substitutions**:** submit for approval.

1. Saddle thresholds**:** 0.200 inches minimum thickness.

I. Exteriors**:** Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25 inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
J. Fire-rated openings, 3-hour duration**:** Thresholds, where scheduled, to extend full jamb depth.
K. Acoustic openings**:** Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
L. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
M. Fasteners**:** Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws**:** full-thread. Sleeve nuts**:** full length to prevent door compression.
N. Through-bolts**:** Verify with Architect. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

1. Exception**:** surface-mounted overhead stops, holders, and friction stays.

O. Silencers**:** Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent**:** door bears against silencers, seals make minimal contact with minimal compression – only enough to effect a seal.
P. Key Control Software**:** Same manufacturer as key cylinders, supply to Owner.
Q. Wall- & Floor-mounted electromagnetic door holders**:** LCN's SEM series or approved equivalent. Incorporate into U.L. listed fire & life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware.

2.7 FINISH**:**

A. Generally**:** BHMA 626 Satin Chromium Steel **OR** BHMA 630 Satin Stainless Steel.

1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.

B. Door closers**:** factory powder coated to match other hardware, unless otherwise noted.

C. Finish designators used in appended hardware schedule**:**

| ANSI | US | Description | Base Metal |
|---|---|---|---|
| 613 | US10B | Dark Oxidized satin bronze, oil rubbed finish | Bronze |
| 695 | SP313 | Dark Bronze Painted | Brass |
| 710 | 313AN | Dark Bronze Anodized | Aluminum |
| D | | Dark Brown | Any |

D. Seal color to be as selected by Architect.

2.8 KEYING REQUIREMENTS**:**

A. Key System**:** existing system. Initiate and conduct meeting(s) with Owner to determine system structure, furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner. Furnish temporary construction-keyed and permanent cylinders. Contractor to demonstrate to the Owner that temporary keys no longer operate the locking cylinders at the end of the project.

**PART 3 - EXECUTION**

3.1 ACCEPTABLE INSTALLERS**:**

A. Can read and understand manufacturers' templates, suppliers' hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION**:**

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.

1. Notify Architect of code conflicts before ordering material.
2. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1008.1.9.2 and 1133B.2.5.2.
3. Locate panic hardware between 36 inches to 44 inches above the finished floor.
4. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

C. Overhead stops**:** before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

D. Existing frames and doors to be retrofitted with new hardware**:**

1. Field-verify conditions and dimensions prior to ordering hardware. Fill existing hardware cut outs not being reused by the new hardware. Remove existing hardware not being reused, return to Owner unless directed otherwise.
2. Remove existing floor closers not scheduled for reuse, fill cavities with non-shrinking concrete and finish smooth.
3. Cut and weld existing steel frames currently prepared with 2.25 inch height strikes. Cut an approximate 8 inch section from the strike jamb and weld in a reinforced section to accommodate specified hardware's strike.

4. Patch and weld flush filler pieces into existing door hardware preparations in steel doors and frames, leave surfaces smooth.
5. Glue in solid wood block fillers to fill cut outs in existing wood doors, sand surfaces smooth. Alternatively, use an approved epoxy-based wood filler product, submit product data for approval.

## 3.3 INSTALLATION

A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.

1. Gaskets**:** install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
4. Replace fasteners damaged by power-driven tools.

B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

D. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.

E. Install closers inside building, stairs, and rooms as scheduled.

F. Drill pilot holes for fasteners in wood doors and/or frames.

G. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

H. Field-verify existing conditions and measurements prior to ordering hardware. Fill existing hardware cut outs not being used by the new hardware.

I. Remove existing hardware not being reused. Tag and bag removed hardware, turn over to Owner.

J. Where existing wall conditions will not allow door to swing using the scheduled hinges, provide wide-throw hinges and if needed, extended arms on closers.

K. Provide manufacturer's recommended brackets to accommodate the mounting of closers on doors with flush transoms.

## 3.4 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods**:** repair or replace to Owner's satisfaction.
2. Adjust doors to fully latch with no more than 1 pound of pressure.
3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
4. Adjust door closers per 1.9 this section.

B. Fire-rated doors**:**

1. Wood doors**:** adjust to 0.125 inches clearance at heads, jambs, and meeting stiles.
2. Steel doors**:** adjust to 0.063 inches minimum to 0.188 inches maximum clearance at heads, jambs, and meeting stiles.
3. Adjust wood and steel doors to 0.75 inches maximum clearance (undercut) above threshold or finish floor material under door.

C. Adjust closers to meet ADA

D. Final inspection**:** Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following**:**

1. Has re-adjusted hardware.
2. Has evaluated maintenance procedures and recommend changes or additions, and instructed Owner's personnel.
3. Has identified items that have deteriorated or failed.
4. Has submitted written report identifying problems.

3.5 DEMONSTRATION**:**

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING**:**

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

SpeXtra: 273109

Hardware Group No. 000

For use on mark #(s):
101 103

Each To Have:

ALL HARWDARE TO BE PROVIDED BY DOOR MANUFACTURER

Hardware Group No. 001

For use on mark #(s):
120

Each To Have:

ALL HARDWARE PROVIDED BY GATE MANUFACTURER

Hardware Group No. 800AV

For use on mark #(s):

125 126

Each To Have:

| Qty | | Description | Catalog Number | Finish | Mfr |
|---|---|---|---|---|---|
| 2 | EA | CONT. HINGE | 112HD/224HD AS REQ'D | 710 | IVE |
| 2 | EA | DUMMY PUSH BAR | 330 LENGTH AS REQ | 613 | VON |
| 2 | EA | 90 DEG OFFSET PULL | 8190-O 10" | 613 | IVE |
| 2 | EA | SURFACE CLOSER | 4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ | 695 | LCN |
| 1 | SET | SEAL | PERIMETER SEAL BY FRAME MANUFACTURER | | |
| 1 | SET | ASTRAGAL | MEETING STILE SEAL BY DOOR MANUFACTURER | | |

Hardware Group No. C714A

For use on mark #(s):

123 124

Each To Have:

| Qty | | Description | Catalog Number | Finish | Mfr |
|---|---|---|---|---|---|
| 2 | EA | CONT. HINGE | 112HD/224HD EPT (AS REQ'D) | 710 | IVE |
| 2 | EA | POWER TRANSFER | EPT10 CON | 695 | VON |
| 1 | EA | KEYED REMOVABLE MULLION | KR4954-STAB-MT54 | 695 | VON |
| 1 | EA | ELEC PANIC HARDWARE | RX-QEL+-33A-EO-CON LENGTH AS REQ | 613 | VON |
| 1 | EA | ELEC PANIC HARDWARE | RX-QEL+-33A-NL-OP-CON LENGTH AS REQ | 613 | VON |
| 1 | EA | MORTISE CYLINDER | MATCH OWNER'S STANDARD | | |
| 1 | EA | RIM CYLINDER | MATCH OWNER'S STANDARD | | |
| 2 | EA | PERMANENT CORE | MATCH OWNER'S STANDARD | | |
| 2 | EA | 90 DEG OFFSET PULL | 8190-O 10" | 613 | IVE |
| 2 | EA | SURFACE CLOSER | 4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ (TOP JAMB MOUNT) | 695 | LCN |
| 1 | SET | SEAL | PERIMETER SEAL BY FRAME MANUFACTURER | | |
| 1 | SET | ASTRAGAL | MEETING STILE SEAL BY DOOR MANUFACTURER | | |
| 2 | EA | DOOR SWEEP | 39D LENGTH AS REQ | D | ZER |
| 1 | EA | THRESHOLD | 65A LENGTH AS REQ | A | ZER |
| 2 | EA | HARNESS (TO POWER SUPPLY) | CON-6W | | VON |
| 1 | EA | DOOR POSITION SWITCH | FURNISHED BY SECURITY CONTRACTOR | | B/O |
| 1 | EA | CARD READER | FURNISHED BY SECURITY CONTRACTOR | | B/O |
| 1 | EA | POWER SUPPLY | FURNISHED BY SECURITY CONTRACTOR | | B/O |
| 2 | EA | HARNESS (IN DOOR) | ALLEGION CONNECT TYPE & LENGTH AS REQ | | VON |

-INGRESS BY THE CARD READER OR KEY OVERRIDE.
-EGRESS BY THE PUSH PADS.
NOTE: MOUNT CLOSER ON TOP JAMB PUSH SIDE.

**END OF SECTION**

## SECTION 088200 – METAL GLAZING INFILL PANELS

### 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. Scope: Provide design and engineering, labor, material, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for metal glazing panels as required for the complete performance of the work and as shown on the Drawings and as herein specified.
   1. Metal Composite Insulated Glazed Infill Panel

1.3 DEFINITION

1.4 Metal Glazing Infill Panels: Metal panels and reinforcement system components. Panels are designed to be a glazed into a window system or curtain wall system

1.5 COORDINATION

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

1.6 ACTION SUBMITTALS

A. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but shall not be limited to, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal glazing panels.

B. Shop Drawings: Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data, including, but not limited to, fabrication and installation layouts of metal glazing panels.

C. Samples:
   1. Submit samples for initial color selection. Submit samples for each type of metal glazing panel indicated with factory applied color finishes. Submit samples in form of manufacturer's color charts showing full range of colors and finishes available. Where finishes involve normal color variations, include samples showing the full, range of variations expected.
   2. Submit samples for verification purposes. Submit 12 inch aquare minimum size sample of selected color coating. Additional samples may be required to show design, fabrication techniques, and workmanship

D. Closeout:
   1. Warranty Data: Submit samples of special warranties

1.7 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of metal glazed panels of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of five years.

B. Installer Qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing metal glazed panels similar in type and scope to that required for this Project.

C. Installer shall assume undivided responsibility for all components of the panel system

D. Engineer Qualifications: The engineer shall be a professional engineer legally authorized to practice in the jurisdiction where the Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of products similar to this Project in material, design, and extent, and that have a record of successful in service performance.

E. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

F. Single Source Responsibility: Obtain each type of metal glazing panel from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work.

G. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Install metal glazing infill panels in mockupsto match glazing systems required for Project, including glazing methods.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.

1. Deliver components, sheets, metal glazing panels, and other manufactured items so as not to be damaged or deformed. Package metal glazing panels for protection during transportation and handling.

B. Store materials in their original, undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Unload, store, and erect metal glazing panels in a manner to prevent bending, warping, twisting, and surface damage.
2. Store metal glazing panels vertically, covered with suitable weathertight and ventilated covering. Store metal glazing panels to ensure dryness, with positive slope for drainage of water. Do not store metal glazing panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 °F (67 °C).
3. Retain strippable protective covering on metal glazing panel for period of panel installation.

1.10 FIELD CONDITIONS

A. Environmental Requirements: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal glazing panels to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Take field measurements prior to fabrication of the work and preparation of shop drawings, to ensure proper fitting of the work. Show recorded measurements on final shop drawings. Notify the Owner and the Architect, in writing, of any dimensions found which are not within specified dimensions and tolerances in the Contract Documents, prior to proceeding with the fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.

C. Field fabrication is allowed to ensure proper fit but keep field fabrication to minimum with majority of fabrication being done under controlled shop conditions. Where final panel dimensions cannot be established by field measurement before commencement of panel manufacturing, make allowance for field adjustments and thermal movement as recommended by panel manufacturer.

1.11 WARRANTY

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

1. Failures include, but are not limited to, the following:
   a. Structural failures, including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Five 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 aluminum wall panels that show 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 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   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. General Performance: Metal glazing panels assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Panel composite assembly shall conform to ASTM E84, flame spread resistance, Class A.

C. Metal glazing panels to withstand a positive and negative windload pressure acting inward and outward normal to the plane of the wall to meet the requirements of the latest adopted Local Building Code.

D. Metal glazing panels shall make provisions in the wall system for thermal expansion and contraction of the components due to accumulation of dead loads and variations of live loads.

E. Glazing panel system to be sealed at all joints, intersections and cutouts to prevent moisture intrusion of any type.

2.2 MATERIALS AND ACCESSORIES

A. Aluminum:
   1. Aluminum Extrusions: ASTM B 221/B 221M, Alloy 6063 T6 or Alloy 6061 T6.
   2. Aluminum Sheet and Plate: ASTM B 209/B 209M, Alloy 3003 or Alloy 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

B. Fasteners: Provide self tapping screws, bolts, nuts, self locking rivets and bolts, end welded studs, and other suitable fasteners designed to withstand design loads.

C. System Brake Metal: Provide 0.063 inch (1.60 mm) minimum thickness aluminum sheet; where exposed, painted to match adjacent metal framing or panel system.

D. Sealants Within Panel System: Comply with panel manufacturer's requirements.

E. Fasteners:
   1. Exposed Fasteners: Stainless steel, or as recommended by panel manufacturer.
   2. Concealed Fasteners: Climaseal coated, stainless steel, or as recommended by panel manufacturer.

F. Sealants: For sealant work not part of metal glazing panel assemblies see Section 07 90 00 Joint Protection.

G. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.

2.3 METAL COMPOSITE INSULATED GLAZED INFILL PANEL

A. Manufacturer: Subject to compliance with requirements, provide product indicated in master schedules or comparable product by one of the following:
   1. Citadel, GlazeGuard 1000WR
   2. Laminators Inc., Thermolite
   3. H&H Metails, Insulated Aluminum Composite Infill Spandrel Panels

B. Panel Composition:
   1. Face Skin: 0.024 inch (minimum) prefinished smooth aluminum
   2. Face Stabilizer: 4mm high density polypropylene
   3. Core: 11/16 inch isocyanurate (ISO) foam
   4. Back Stabilizer: 4mm high density polypropylene
   5. Back Skin: 0.024 inch (minimum) prefinished smooth aluminum
   6. Panel Tolerances:
      a. Thickness: ±1/16"
      b. Length and Width: +0, -1/8"
      c. Squareness: 1/64" per lineal foot
   7. Attachment System: To be used as glazing infill or inserted into encapsulating watertight channel.

C. Fire Resistant (FR) Core: Flame spread rating of 15 and a smoke developed rating of 30 with a center panel joint; flame spread of 0 and a smoke developed of 0 with no joint; tested in accordance with ASTM E 84, Class A building material rating.

D. Bond Integrity: When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall not be an adhesive failure of the bond between the core and the skin, or cohesive failure of the core itself below the following values:
   1. Peel Strength:
      a. FR Core: 22.5 in.lb./inch (115 N•mm/mm) as manufactured, 22.5 in.lb./inch (115 N•mm/mm) after 21 days soaking in water at 70 °F (21 °C)

2.4 FINISHES

A. High Performance Organic Coating: AA C12 C42 R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate fluoride phosphate pretreatment; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

1. Standard Two Coat Polyvinylidene Fluoride (PVDF) Finish Coating: Manufacturer's standard thermocured system, complying with AAMA 2605, composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight, as produced by Arkema, Inc. ("Kynar 500") or by Solvay Solexis, Inc. ("Hylar 5000"). Provide minimum 1.2 mil (0.030 mm) total dry film thickness. Provide color to match the Architect's sample, or, if no sample, as selected by the Architect from manufacturer's standard choices for color and gloss.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Examine substrates, areas, and conditions, with the Installer present, for compliance with requirements for installation tolerances, metal glazing panel supports, systems and other conditions affecting performance of the work.

C. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

A. Coordination: Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.

3.3 INSTALLATION

A. Panels shall be installed using standard accepted commercial trade practices which include.

1. Flexible setting blocks at the quarter points of each panel and in a width equal to the panel thickness.
2. Panels to be sealed with Class A grade sealants.
3. Butt Glazing is not recommended.
4. Weep holes, for proper draining of the frames are required on all installations.
5. A minimum of ¼" of clearance must be maintained around the entire perimeter of the panel.
6. The entire panel perimeter should be engaged into the framing system a minimum of ½". ( 5/8" if panel size has 32 sq. ft. or more)
7. DO NOT use mechanical fasteners through the panel face as such fasteners interfere with thermal expansion and contraction of the panel skin which may cause "Blistering"

B. Panels shall be erected in accordance with approved shop drawings.

C. Installing contractor shall furnish all materials required for setting.

D. Where aluminum materials come in contact with dissimilar materials, an isolation shim or tape shall be installed at fastening locations.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal glazing panels are installed unless otherwise indicated in manufacturer's written installation instructions.

B. After metal glazing panel installation, clear weepholes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal glazing panels that have been damaged or have deteriorated beyond successful repair by finish touch up or similar minor repair procedures.

D. Any additional protection, after installation, shall be the responsibility of the general contractor to remove.

E. Final cleaning shall not be part of the work of this Section..

3.5 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to the Installer, that shall ensure that the metal glazing panels shall be without damage at time of Substantial Completion.

**END OF SECTION**

## SECTION 092216 - NON-STRUCTURAL METAL FRAMING

### PART 1 - GENERAL

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

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

1.3 ACTION SUBMITTALS
- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS
- A. Evaluation Reports: For firestop tracks, from ICC-ES.

### PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

2.1 MANUFACTURERS
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. CEMCO Steel Framing Systems
  2. ClarkWestern Building Systems, Inc.
  3. Dietrich Metal Framing; a Worthington Industries Company.
  4. MarinoWARE.
  5. Nuconsteel; a Nucor Company.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 35% percent.
- C. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- D. Studs and Runners: ASTM C 645.
  1. Steel Studs and Runners:
     a. Minimum Base-Metal Thickness: 25 gage unless indicated otherwise on Drawings or below.
        1) Interior Metal Stud/Gypsum Board Assemblies, Typical Locations: Withstand lateral loading (air pressure) of 5 psf with deflection limit not more than L/240 of partition height.
        2) Interior Metal Stud/Gypsum Board Assemblies at Atriums, Lobbies, Service Corridors, Exit Corridors, Elevator Lobbies, Vertical Shafts, and walls receiving plaster veneer: Withstand lateral loading (air pressure) of 7.5 psf with deflection limit not more than L/360 of partition height
        3) Interior Metal Stud/Gypsum Board Assemblies at Locations with Ceramic Tile or Other Hard Surface Finishes: Withstand typical lateral loading (air pressure) with

deflection limit not more than L/360 of partition height, minimum 22 gage studs at 16 inches on center.
4) Where wall mounted equipment, woodwork, and casework items are indicated or elsewhere as shown on Drawings, provide minimum 16 gage studs
5) At jambs of openings provide two minimum 20 gage studs.
6) Ceilings: At ceilings using mold-mildew resistant gypsum framing to be 16 inches o.c. for 5/8 inches gypsum
7) Refer to Division 5 for stud framing which is exposed to wind loads and for studs carrying heavy vertical loads (cement plaster, manufactured stone masonry, stone tile thicker than 3/4 inch, etc)

b. Where partition heights exceed stud manufacturer's recommended spans, provide one of the following:
1) Heavier stud gage.
2) Closer stud spacing.
3) Deeper stud size (space permitting); As approved by Architect.
4) Above ceiling bracing, anchored to structure above.

c. Depth: As indicated on Drawings.

E. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
a. Products: Subject to compliance with requirements, provide one of the following:
1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
2) MBA Building Supplies; .
3) Steel Network Inc. (The); VertiClip SLD Series.

F. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
b. Metal-Lite, Inc.; The System.

G. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.018 inch.

H. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

I. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.018 inch.
2. Depth: 7/8 inch.

J. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical.
2. Basis of Design: Clark Dietrich, RC Deluxe single leg resilient channel.

K. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges.
1. Depth: 3/4 inch.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

2.2 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:
1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
a. Type: Postinstalled, expansion anchor.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of

sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.
   1. Depth: 2-1/2 inches.
F. Furring Channels (Furring Members):
   1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
   2. Steel Studs and Runners: ASTM C 645.
      a. Minimum Base-Metal Thickness: 0.018 inch.
      b. Depth: 1-5/8 inches.
   3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
      a. Minimum Base-Metal Thickness: 0.018 inch.
   4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
      a. Configuration: Asymmetrical.
G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Armstrong World Industries, Inc.; Drywall Grid Systems.
      b. Chicago Metallic Corporation; Drywall Grid System.
      c. USG Corporation; Drywall Suspension System.

2.3 AUXILIARY MATERIALS
A. General: Provide auxiliary materials that comply with referenced installation standards.
B. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
C. Isolation Strip at Exterior Walls: Provide the following:
   1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

**PART 3 - EXECUTION**

3.1 EXAMINATION
A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
   1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
B. Coordination with Sprayed Fire-Resistive Materials:
   1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
   2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL
A. Installation Standard: ASTM C 754.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. 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.

3.4 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.
1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
3. Partitions with Security Mesh: 8 inches (203 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.

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. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
   c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
5. Curved Partitions:
   a. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 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.
   1. Hangers: 48 inches o.c.
   2. Carrying Channels (Main Runners): 48 inches o.c.
   3. Furring Channels (Furring Members): 16 inches o.c.

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 required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
      a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
   3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   5. Do not attach hangers to steel roof deck.
   6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
   7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

**END OF SECTION 092216**

## SECTION 092900 - GYPSUM BOARD

## 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. Interior gypsum board.
   2. Specialty Gypsum Board
   3. Tile backing panels.
   4. Trim Accessories

1.3 SUBMITTALS

A. Product Data: For each type of product.
   a. Include statement indicating costs for each product having recycled content.

B. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Install mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
   2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
   3. Simulate finished lighting conditions for review of mockups.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. At Contractor’s request, Owner and Architect may consider use of Glass-Mat Interior Gypsum Board panel products without additional cost to the Owner.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

D. Install cavity wall insulation and interior gypsum board only after building is enclosed with exterior wall assembly as detailed in the drawings.

## PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. VOC Limits: any adhesives, sealants, paints, or coatings shall meet the VOC limits indicated in Section 018113.

B. 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.
C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL
A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.
B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
2. Long Edges: Tapered.
C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD
A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
b. Temple-Inland; GreenGlass Interior Glass-Mat Board.
2. Core: 5/8 inch, Type X .
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TILE BACKING PANELS
A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
a. C-Cure; C-Cure Board 990.
b. CertainTeed Corp.; FiberCement .
c. Custom Building Products; Wonderboard.
d. James Hardie Building Products, Inc.; Hardiebacker.
e. National Gypsum Company, Permabase Cement Board.
f. USG Corporation; DUROCK Cement Board.
2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES
A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.
B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fry Reglet Corp.
b. Gordon, Inc.
c. Pittcon Industries.
2. Basis of Design: Refer to Architect's Master Schedule
3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.

2.7 JOINT TREATMENT MATERIALS
A. General: Comply with ASTM C 475/C 475M.
B. Joint Tape:
1. Interior Gypsum Board: Paper.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
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.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS
A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Pecora Corporation; AC-20 FTR or AIS-919.
b. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
c. USG Corporation; SHEETROCK Acoustical Sealant.
2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

**PART 3 - EXECUTION**

3.1 EXAMINATION
A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL
A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
E. Form control and expansion joints with space between edges of adjoining gypsum panels.
F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
    1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
    2. Fit gypsum panels around ducts, pipes, and conduits.
    3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 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.
H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
    1. Type X: Vertical surfaces unless otherwise indicated.
    2. Flexible Type: Apply in double layer at curved assemblies.
    3. Ceiling Type: Ceiling surfaces.
    4. Glass-Mat Interior Gypsum: To be used when building envelope is not completed and water and moisture may be present in building.
B. Single-Layer Application:
    1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
    2. On partitions/walls, apply gypsum panels vertically (parallel to framing unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
        a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
        b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
    3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
    4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
C. Multilayer Application:
    1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
    2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
    3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C 840 and in specific locations approved by Architect for visual effect.
1. Wall: Control joints shall be installed where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet, or 900 sq ft.
2. Ceiling with Perimeter relief: Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 ft or 2500 sq. ft
3. Ceiling, without perimeter relief: Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 ft
4. Exterior: Control joints in exterior ceilings and soffits shall be installed so that linear dimensions between control joints do not exceed 30 ft. at acoustical or fire-rated walls: Where a control joint occurs in an acoustical or fire rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8 in. type X gypsum panel products, mineral fiber, or other tested equivalent.

C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use where indicated.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use where indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. 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 and where indicated on Drawings.
3. Level 3: Beneath wall coverings.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
5. Level 5: Where indicated on Drawings.
a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION 092900**

## SECTION 096513 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Resilient base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Sustainable Documentation Submittals:
   1. VOC content data. Provide for any adhesives, sealants, paints, or coatings used on the interior of the building.
      a. Product information or statement from manufacturer indicating the VOC content of the product in grams per liter (g/L).
C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.
B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg For more than 95 deg F.
C. Install resilient products after other finishing operations, including painting, have been completed.

### PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

A. VOC Limits: any adhesives, sealants, paints, or coatings shall meet the VOC limits indicated in Section 018113.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Burke Mercer Flooring Products, Division of Burke Industries Inc.
   2. Flexco.
   3. Roppe Corporation, USA.
C. Basis of Design: Refer to Architect’s Master Schedule.
D. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
E. Thickness: As indicated in Architect’s Master Schedule.
F. Height: As indicated in Architect’s Master Schedule.
G. Lengths: Coils in manufacturer's standard length.
H. Outside Corners: Job formed .
I. Inside Corners: Job formed .

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 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 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 in length.
      a. Miter corners to minimize open joints.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

**END OF SECTION 096513**

## SECTION 096813 - TILE CARPETING

## PART 1 - GENERAL

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

1.2 SUMMARY
- A. Section includes modular, carpet tile.

1.3 ACTION SUBMITTALS
- A. Product Data: For each type of product.
  1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  2. Include installation recommendations for each type of substrate.
- B. Sustainable Documentation Submittals:
  1. VOC content data. Provide for any adhesives, sealants, paints, or coatings used on the interior of the building.
     a. Product information or statement from manufacturer indicating the VOC content of the product in grams per liter (g/L).
- C. Shop Drawings: Show the following:
  1. Floor Plan showing overall layout including: 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. Pattern of installation.
  4. Pile direction.
  5. Type, color, and location of insets and borders.
  6. Type, color, and location of edge, transition, and other accessory strips.
  7. Transition details to other flooring materials.
- D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  1. Carpet Tile: Full-size Sample.
- E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 QUALITY ASSURANCE
- A. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING
- A. Comply with CRI 104.

1.8 FIELD CONDITIONS
- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 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 does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

A. CARPET TILE Products: Subject to compliance with requirements, provide one of the following:
1. Interface.
2. Lees Carpet.
3. Shaw Industries.
B. Basis of Design Product: As indicated in Master Schedule.
C. VOC Limits: any adhesives, sealants, paints, or coatings shall meet the VOC limits indicated in Section 018113.

2.2 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 complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

**PART 3 - EXECUTION**

3.1 EXAMINATION
A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," 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. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.
B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

**END OF SECTION 096813**

## SECTION 099100 - PAINTING

## PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 01 General Requirements, and Drawings are applicable to this Section.

B. Section Includes:

1. Complete surface preparation and finishing for field application of coatings and requirements for field finishing mechanical and electrical equipment.
2. Examine specifications for various other trades and their provisions regarding their painting. Surfaces that are left unfinished by other sections of the specifications shall be painted or finished as a part of this Section.
3. Colors, including deep tones, will be selected by the Architect. Number of colors to be used on job will be determined by Architect.

1.2 SURFACES NOT TO RECEIVE FIELD FINISHING

A. Do not paint copper, bronze, chrome plated items, nickel, stainless steel, Monel metal, lead, face brick, prefinished wall, ceiling, and floor coverings, items with factory applied final finish (except where exposed on roofs and in finished spaces), elevator shafts, crawl spaces, chases, and plenums above suspended ceilings unless otherwise specified or scheduled.

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.4 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with 3 years experience.

B. Applicator: Company specializing in commercial painting and finishing with 2 years experience.

C. Product Labels: Include manufacturer's name, type of paint, stock number, color and label analysis on label of containers.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable building code for flame spread/fuel contribution/smoke development rating requirements for finishes.

B. Comply with applicable city, county, state, and federal requirements and ordinances regarding maximum VOC (Volatile Organic Compound) content of all coatings.

1.6 TESTS

A. Provide periodic testing with Wet Film Thickness gage to verify that proper thickness of finish coatings are being applied.

1.7 SUBMITTALS

A. Provide product data describing physical performance criteria and composition on all finishing products.

B. Samples, 12 by 12 inches in size illustrating range of colors and textures selected for each surface finishing product scheduled.

C. Submit certification from manufacturer of coatings listing all products proposed for each. Certify that each product meets current applicable regulations and ordinances regarding maximum VOC content.

1.8 MOCKUP PANELS

A. Provide field sample panel, 96 inches long by 96 inches wide, illustrating each coating color, texture, and finish intended for use.

B. Locate where directed.

C. Accepted sample may remain as part of the Work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products under provisions of Division 1 section “Product Requirements”

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.

C. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.10 ENVIRONMENTAL REQUIREMENTS
A. Do not apply materials when surface and ambient temperatures are outside the ranges required by paint manufacturer.
B. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
C. Do not apply exterior coatings during rain or snow, or when relative humidity is above 75 percent, unless required otherwise by manufacturer's instructions.
D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
E. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
F. Provide lighting level of 80 ft candles measured mid- height at substrate surface.

1.11 EXTRA STOCK
A. Provide a 5 gallon container of each color to Owner.
B. Label each container with color, color number, texture, and room locations, in addition to the manufacturer's label.

1.12 SCAFFOLDS AND PROTECTION
A. Provide adequate safe ladders, scaffolds, and stages necessary to complete work.
B. Protect completed finish and paint work, and protect adjacent finish surfaces from paint splatter, spills and stains. Use adequate drop cloths and masking procedures during progress of work.

1.13 PRECAUTIONS
A. Do not store paints, oils, thinners and other flammable items inside the building and shall be stored in approved containers when not in actual use during the painting job. The fire hazard shall be kept at a minimum.
B. Precaution shall be taken to protect the public and construction workers during the progress of the work.
C. Furnish a temporary fire extinguisher of suitable chemicals and capacity, located near flammable materials.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS
A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:
1. Behr Process Corporation (Behr)
2. Benjamin Moore.
3. PPG Paints
4. Sherwin-Williams.
B. Materials selected for coating systems for each type surface shall be product of a single manufacturer unless otherwise specified. Secondary products such as linseed oil, turpentine and shellacs shall be first quality products of a reputable manufacturer.

2.2 MATERIALS
A. VOC Limits: any adhesives, sealants, paints, or coatings shall meet the VOC limits indicated in Section 018113.
B. Coatings: Ready mixed. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating with good flow and brushing properties; capable of drying or curing free of streaks or sags.
C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
D. Patching Materials: Latex filler.

2.3 FINISHES
A. Color and Sheen: As indicated on Architect's Master Schedule.

2.4 INTERIOR PAINT SCHEDULE
A. Drywall (Gypsum):
1. Latex:
a. PPG: 1 coat Speedhide latex sealer 6-2 primer, 2 coats Speedhide zero VOC latex
b. Sherwin-Williams: 1 coat High Build Latex Primer B28W8601, 2 coats Sherwin-Williams ProMar 200 Zero VOC
c. Behr: 1 coat Premium Plus Interior Drywall Primer 73; 2 coats Behr Pro i300 Interior Paint.

**PART 3 - EXECUTION**

3.1 EXAMINATION
A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report to Architect any condition that may potentially affect proper application.
C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums
1. Plaster and Gypsum Wallboard: 12 percent.
D. Test shop applied primers for compatibility with subsequent cover materials.
E. Beginning of installation means acceptance of existing surfaces and substrate.

3.2 PREPARATION
A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
B. Correct minor defects and clean surfaces which affect work of this Section. Remove existing coatings which exhibit loose surface defects.
C. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.

3.3 SURFACE PREPARATION OF PREVIOUSLY COATED SURFACES
A. General:
1. Remove cracked and deteriorated sealants and calking.
2. Remove chalk deposits and loose, blistered, peeling, scaling, or crazed finish to bare base material or sound substrate by scraping and sanding.
3. Wash surfaces with solution of TSP to remove wax, oil, grease, and other foreign material; rinse, and allow to dry. Exercise caution that TSP solution does not soften existing coating.
4. Abrade glossy surfaces by sanding or wiping with liquid de-glosser.
5. Remove mildew as specified above.
6. Test compatibility of existing coatings by applying new coating to small, inconspicuous area. If new coatings lift or blister existing coatings, request recommendation from Architect.
7. Apply specified primer to surfaces scheduled to receive coatings.
B. Gypsum Wallboard:
1. Fill cracks and voids with spackling compound.
2. Apply primer over bare surfaces and newly applied texture coatings.

3.4 PROTECTION
A. Protect elements surrounding the work of this Section from damage or disfiguration.
B. Repair damage to other surfaces caused by work of this Section.
C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
D. Remove empty paint containers from site.

3.5 APPLICATION
A. The intent of these Specifications is to produce the highest quality appearance of paint and finish surfaces. Employ skilled mechanics only. The proper preparation of all surfaces will be strictly enforced and wherever finished surfaces show any defects due to improper preparation, workmanship, etc., the defects shall be removed and the work refinished at the expense of the Contractor.

B. Apply products in accordance with manufacturer's instructions. Final finish coats shall have visual evidence of solid hiding and uniform appearance, and shall be free and smooth of brush marks, streaks, sags, runs, laps, or skipped areas.
C. Do not apply finishes to surfaces that are not dry.
D. Apply each coat to uniform finish and thickness.
E. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
F. Sand lightly between coats on wood and metal items to achieve required finish.
G. Allow applied coat to dry before next coat is applied.
H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
I. Prime back surfaces of interior and exterior woodwork scheduled to be painted with primer paint.
J. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
K. Edges of paint adjoining other materials or colors shall be sharp and clean with no overlapping.

3.6 CLEANING/TOUCH-UP
A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
D. Spot painting will be allowed to correct soiled or damaged paint surfaces only when touch-up spot will blend into surrounding finish and is invisible to normal viewing (as determined by the Architect). Otherwise, re-coat entire section to corners or to a visible stopping point.

3.7 V.O.C. (VOLATILE ORGANIC COMPOUND) COMPLIANCE
A. Products listed in following schedule and/or substitutes proposed for use by Contractor must be formulated to meet all applicable ordinances and regulations regarding maximum V.O.C. content. Utilize products which have been specially formulated to need such requirements.

**END OF SECTION**

## SECTION 099653.12 - ELASTOMERIC COATING REPAIR

### PART 1 GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application of Bonding Agents, Reinforcement Protection, Repair Mortar, and Elastomeric Coatings to the exterior concrete and repaired concrete substrates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Indicate VOC content.

B. Samples for Initial Selection: For each type of bonding agents, reinforcement protection, repair mortar, and elastomeric coatings.

C. Samples for Verification: For each type of elastomeric coating indicated and in each color and gloss.
   1. Submit Samples on same type of substrate as that to receive application, 8 inches square.
   2. Apply coats on Samples in steps to show each separate coat, including bonding agent, mortar repair, primers, base coat, and elastomeric coating as applicable.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 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 content.
   1. Quantity: Furnish an additional not less than 1 gal. of each material, color, and texture applied.

1.4 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.
      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.

1.5 DELIVERY, STORAGE, AND HANDLING

A. 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 and no more than 90 def F.

B. Maintain containers not in use in a controlled environment that is shaded from UV light.

C. Maintain containers in clean condition, free of foreign materials and residue.

D. Remove rags and waste from storage areas daily.

E. Dispose of any materials that have exceeded the manufacturers shelf life recommendations.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 90 deg F unless otherwise permitted by manufacturer's written instructions.

B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures, less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace elastomeric coatings that fail within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Water penetration through the coating.
      b. Deterioration of coating beyond normal weathering.
   2. Warranty Period: 1 years from date of Substantial Completion.

**PART 2 PRODUCTS**

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products manufactured by the Sika Corporation.

2.2 MATERIALS

A. Moisture-Vapor Transmission: 14.5 perms, based on testing according to ASTM D 96.

B. Material Compatibility:
   1. Materials for use within each paint system shall be 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, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

D. Bonding Agent and reinforcement protection: Solvent-free, moisture-tolerant, epoxy-modified, cementitious product specifically formulated as a bonding agent and anti-corrosion coating.
   1. Product: Sika® Armatec® 110 EpoCem
      a. Compressive Strength when tested per ASTM C-109.
         1) 3 days 4500 psi
         2) 7 days 6500 psi
         3) 28 days 8500 psi
      b. Flexural Strength when tested per ASTM C348
         1) 28 days 1250 psi
      c. Splitting Tensile Strength when tested per ASTM C-496
         1) 28 days 600 psi

E. Repair Mortar: One component, ready-to-use repair mortar for vertical and overhead applications using specialty cement blends.
   1. Product SIKAQuick VOH.
      a. Splitting Tensile Strength when tested per ASTM C-496
         1) 1 day 200 psi
         2) 7 days 250 psi
         3) 28 days 500 psi
      b. Compressive Strength when tested per ASTM C-109
         1) 3 hrs. >2000 psi

2) 1 day 3000 psi
3) 7 days 4500 psi
4) 28 days 5500 psi

c. Bond Strength when tested per ASTM C-882 modified.
1) 1 day 1000 psi
2) 7 days 1600 psi
3) 28 days 2000 psi

F. Crack Fillers: Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated.

G. Primer: Adhesion promoter, surface conditioner for concrete surfaces, factory-formulated, alkali- resistant primer compatible with substrate and other materials indicated.
1. Product: SIKA 552W Primer.
a. Solids Content: 20% by volume.

H. Base Coat: Elastic, crack-bridging, anti-carbonation, acrylic base coat with texture selected by Architect.
1. Product: Sika Elastic Base Coat (Smooth & Textured).
2. Solids Content:
a. Smooth: 63 percent by weight, 47 percent by volume.
b. Textured: 64 percent by weight, 40 percent by volume.
3. Tensile Properties When Tested According to ASTM D 412 (Modified):
a. At 7 days:
1) Tensile Strength: 165 psi.
2) Elongation at Break: 370 percent/
b. At 30 days:
1) Tensile Strength: 210 psi.
2) Elongation at Break: 345 percent.
4. Low Temperature Flexibility When Tested According to ASTM C 711: No Change at 0 deg F with 1/2-inch Mandrel, 180 deg bend.
5. Moisture Vapor Permeability When Tested According to ASTM E-96: 10 Perms.

I. Finish Coat: Elastomeric, crack-bridging, anti-carbonation, acrylic protective coating.
1. Product: Sikagard 550W Elastocolor.
2. Solids Content: 62 percent by weight, 55 percent by volume.
3. Tensile Properties When Tested According to ASTM D 412 (Modified):
a. Tensile Strength: 190 psi; 1000 psi at 0 deg F.
b. Elongation at Break: 820 percent at 73 deg F; 340 percent at 0 deg F.
4. Crack-Bridging (at 16 mils = 400 microns DFT)
a. Static: 30 mils at minus 4 deg F.
b. Dynamic: More than 1000 cycles at minus 4 deg F; 12 mils.
5. Moisture Vapor Permeability When Tested According to ASTM E-96: 14;5 Perms

## PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and other conditions affecting performance of work.

B. Begin repairs or coating only when moisture content of substrate is 12 percent or less when measured with an electronic moisture meter.

C. Begin coating no sooner than 28 days after substrate is constructed and is visually dry on both sides.

D. Verify that substrate is within the range of alkalinity recommended by manufacturer.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 SURFACE PREPARATION

A. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
   1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

B. Comply with manufacturer's written instructions and recommendations in the “MPI Architectural Painting Specification Manual” applicable to substrates and coating systems indicated.

C. Bonding Agent and reinforcement protection:
   1. Cementitious substrates
      a. Should be cleaned and prepared to achieve a laitance and contaminant-free surface prepared in accordance with the requirements specified by the overlay or repair material by blast cleaning or equivalent mechanical means. Substrate must be saturated surface dry (SSD) with no standing water.
   2. Steel
      a. Should be cleaned and prepared thoroughly by blast cleaning.

D. Repair Mortar:
   1. **Concrete/Mortar** - Remove all deteriorated concrete, dirt, oil, grease, and all bond-inhibiting materials from surface. Preparation work should be done by high pressure water blast, scabbler or other appropriate mechanical means to obtain an exposed aggregate surface profile of +/- 1/16 in. (CSP-5). After preparation, substrate strength should be verified prior to patch placement. Substrate should be saturated surface dry (SSD) with no standing water during application.
   2. **Reinforcing Steel** - Steel reinforcement should be thoroughly prepared by mechanical cleaning to remove all traces of rust. Where corrosion has occurred due to the presence of chlorides, the steel should be high pressure washed with clean water after mechanical cleaning.
   3. **Priming:** Reinforcement Steel: For priming of reinforcement steel use Sika® Armatec® 110 EpoCem (Consult Technical Data Sheet).
   4. **Concrete Substrate:** A scrub coat of SikaQuick® VOH should be applied prior to placement of mortar. The repair mortar has to be applied into the wet scrub coat before it dries. The use of Sika® Armatec® 110 EpoCem as a bonding agent for concrete is not recommended. Mixing Wet down all tools and mixer to be used. Mix mechanically with a low-speed drill (400 – 600rpm) and mixing paddle or mortar mixer. Mix to a uniform consistency, maximum 3 minutes. Manual mixing can be tolerated only for less than a full unit. Thorough mixing and proper proportioning of the powder and liquid is necessary. Inaccurate proportioning of the powder to Liquid will result in a finished product that may not conform with stated properties.
      a. *With water:* Start mixing with 6 pints of water per 44 lb. bag. Adjust the water dosage by a maximum amount of +/- 1/2 pint, if necessary, to achieve the desired consistency. Do not overwater. Over-watering may result in difficulty handling and/or not meeting stated property values.
      b. *With Latex R:* Start mixing with 6 pints of SikaLatex® R per 44 lb. bag. Adjust the SikaLatex® R dosage by a maximum amount of +/- 1/2 pint, if necessary, to achieve the desired consistency.

E. Crack Fillers: Preparation for installation of crack filler should be performed per the Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated.

F. Primer: All surfaces to be primed must be dry, clean, sound, and free of curing compound residues and other bond inhibiting material. Concrete and masonry surfaces - blast clean, high pressure water blast or use other approved mechanical means to achieve a slightly open, roughened substrate.

G. Base Coat: All surfaces to be coated must be dry, clean, sound, and frost-free with curing compound residues and any other foreign matter removed. An open textured sandpaper-like surface is ideal (CSP-3). Where necessary, surfaces should be prepared mechanically by blast cleaning or high pressure water jetting. Allow adequate time for drying. Bug holes or irregularities of substrate should be leveled with SikaTop®, Sika® MonoTop® leveling mortar or surface fillers as appropriate.

H. Finish Coat: All surfaces to be coated must be dry, clean, sound, and frost free with curing compound residues and any other foreign matter removed. An open textured sandpaper like surface is ideal (CSP-3). Where necessary, surfaces should be prepared mechanically by blast cleaning or high speed pressure water jetting. Allow adequate time for drying. Bug holes, cracks or irregularities of substrate should be filled and leveled with SikaTop®, SikaRepair®, SikaQuick® or acrylic surface fillers as appropriate. Cracks 1/32" or greater should be routed and sealed with a polyurethane sealant before coating.

3.3 APPLICATION

A. Consult manufacture for full installation instructions.
   1. A copy of the manufacturers installation instruction must keep at the jobsite and referenced as needed during installation of all products.

B. Apply elastomeric coatings according to manufacturer's written instructions.
   1. Use equipment and techniques best suited for substrate and type of material being applied.
   2. Coat surfaces behind movable items the same as similar exposed surfaces.
   3. Apply each coat separately according to manufacturer's written instructions.

C. Apply coatings 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.

D. Apply coatings to prepared surfaces as soon as practicable after preparation and before subsequent surface soiling or deterioration.

E. Spray Application: Use spray equipment for application only when permitted by authorities having jurisdiction. Wherever spray application is used, do not double back with spray equipment to build up film thickness of two coats in one pass.

F. Bonding Agent and reinforcement protection:
   1. Application as a bonding agent:
      a. Apply by stiff-bristle brush or broom. Spray apply with Goldblatt Pattern Pistol or equal equipment. For best results, work the bonding slurry well into the substrate to ensure complete coverage of all surface irregularities. Apply the freshly mixed patching mortar or concrete wet on wet, or up to the maximum recommended open time, onto the bonding slurry.
   2. For corrosion protection only:
      a. Apply by stiff-bristle brush or spray at 80 ft.2/gal. (20 mils). Take special care to properly coat the underside of the totally exposed steel. Allow coating to dry 2-3 hours at 73°F, then apply a second coat at the same coverage. Allow to dry again before the repair mortar or concrete is applied. Pour or place repair within 7 days.

G. Repair Mortar: The mixed SikaQuick® VOH must be worked well into the prepared substrate, filling all pores and voids. Compact well. Force material against edge of repair working towards the center. Thoroughly compact the mortar around exposed reinforcement. After filling repair, consolidate, then screed. Finish with steel, magnesium, wood, plastic floats, or damp sponges, depending on the desired surface texture. Where multiple lifts are required, score top surface on each lift to produce a roughened substrate for next lift. Allow preceding lift to harden before applying fresh material. Saturate surface of the lift with clean water. If previous layers are over 6 hours old, mechanically prepare the substrate and dampen. Tooling and Finishing**:** As per ACI recommendations for portland cement concrete, curing is required. Moist cure with wet burlap and polyethylene, a fine mist of water or a water based* compatible curing compound. Curing compounds adversely affect the adhesion of following lifts of mortar, leveling mortar or protective coatings. Moist curing should commence immediately after finishing. Protect freshly applied mortar from direct sunlight, wind, rain and frost. Pretesting of curing compound is recommended.

H. Crack Fillers: Installation of crack filler should be performed per the Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated.

I. Primer: Any areas of glass should be protected by masking. Fill all visible hairline cracks and surface defects with appropriate Sika repair mortar, leveling mortar or Sikagard surface fill prior to applying primers. Sikagard Primers can be applied by brush, roller or spray equipment. Brushing provides more even and pore free

coats with better penetration. Allow a minimum of 4 hours prior to re-coating. At lower temperature, the waiting time will be prolonged.

J. Base Coat: Any areas of glass or other surfaces should be masked. Recommended application temperatures (ambient and substrate) 45°-100°F (7°-37°C). Apply by brush, roller, or spray over entire area moving in one direction. To obtain the proper coverage, a minimum of two coats are necessary. Allow a minimum of 2 hours prior to re-coating. Fill all visible hairline cracks and surface defects with appropriate Sika repair mortar, leveling mortar or sealer prior to applying Sikagard® Elastic Base Coat to entire surface. Consult Technical Service for spray application techniques. Note: Brushing provides more even and pore free coats with better penetration. Allow a minimum of 3 hours prior to re-coating. At lower temperatures and high humidity, the waiting time will be prolonged. As with all coatings, job site mock-ups should always be completed to confirm acceptability of workmanship and material.

K. Finish Coat: Any areas of glass or other surfaces should be masked. Recommended application temperatures (ambient and substrate) 45°-95°F (7°-35°C). Sikagard® 550W Elastocolor can be applied by brush, roller, or spray over entire area moving in one direction. Allow a minimum of two hours prior to re-coating. At lower temperatures and high humidity, waiting time will be prolonged. At higher temperatures, work carefully to maintain a wet edge. As with all coatings, job site mock-ups should always be completed to confirm acceptability of workmanship, material and aesthetics. NOTE: To achieve a dry film thickness of 16 mils, two coats must be used.

## 3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following testing procedures:
   1. Owner will engage the services of a qualified testing agency to sample materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
   2. Testing agency will perform tests for compliance of materials with product requirements.
   3. Owner may direct Contractor to stop coating application if test results show materials being used do not comply with requirements. Remove noncomplying materials from Project site, pay for testing, and recoat surfaces that were coated with rejected materials. Remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

B. Field Testing and Inspection: Owner reserves the right to engage the services of a qualified testing agency to verify installed thickness of elastomeric coatings.

## 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 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, touch up and restore damaged or defaced coated surfaces.

## 3.6 ELASTOMERIC COATING SCHEDULE

A. Concrete Substrates:
   1. Elastomeric Coating System:
      a. Prime Coat: As recommended in writing by topcoat manufacturer.
      b. Base Coat: Elastic, crack-bridging, anti-carbonation, acrylic base coat with texture selected by Architect.
      c. Topcoat: Elastomeric, crack-bridging, anti-carbonation, acrylic protective coating.

END OF SECTION

## SECTION 323119 - DECORATIVE METAL FENCES AND GATES

### 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. Decorative stainless steel fence.
  2. Swing gates.

1.3 PREINSTALLATION MEETINGS
- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS
- A. Product Data: For each type of product.
- B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.
  1. Include diagrams for power, signal, and control wiring.
- C. Samples: For each fence material and for each color specified.
  1. Provide Samples 12 inches in length for linear materials.

1.5 INFORMATIONAL SUBMITTALS
- A. Field quality-control reports.
- B. Product Test Reports: For decorative metallic-coated-steel tubular picket fences, including finish, indicating compliance with referenced standard and other specified requirements.

1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For gate operators to include in maintenance manuals.

1.7 QUALITY ASSURANCE
- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  1. Include 4-foot length of fence complying with requirements.
  2. 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 DECORATIVE STAINLESS STEEL FENCES
- A. Decorative Stainless Steel Fences: Fences made stainless steel bars and shapes to match existing fence.
- B. Finish: Match existing fence.
- C. Material: Matchexisting fence.
- D. Welding: Match existing fence.

2.2 SWING GATES
- A. Match existing gate and fence.
- B. Gate Configuration: As indicated.
- C. Gate Frame Height: As indicated.
- D. Gate Opening Width: As indicated.
- E. As indicated.

2.3 MISCELLANEOUS MATERIALS
- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 033000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size or dry, packaged, normal-weight concrete mix complying with ASTM C 387/C 387M mixed with potable water according to manufacturer's written instructions.
C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M and specifically recommended by manufacturer for exterior applications.

**PART 3 - EXECUTION**

3.1 EXAMINATION
A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
1. Construction layout and field engineering are specified in Section 017300 "Execution."

3.3 DECORATIVE FENCE INSTALLATION
A. Install fences according to manufacturer's written instructions.

3.4 GATE INSTALLATION
A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 ADJUSTING
A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
B. Lubricate hardware and other moving parts.

**END OF SECTION 323119**