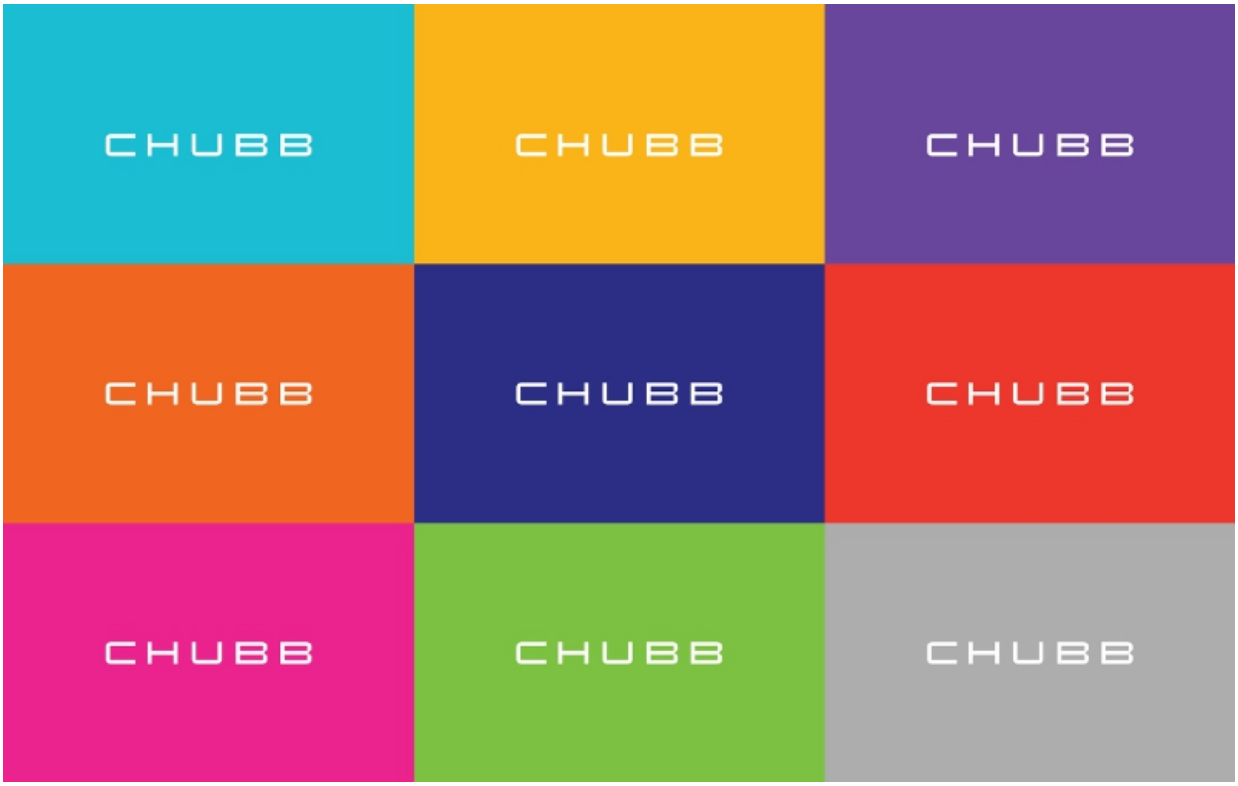
Project Manual



OVERLAND PARK BRANCH & ESIS RELOCATION

for

Chubb
Floor 4
34 Corporate Woods
10950 Grandview Drive
Overland Park KS 66210
Issued for Bid & Permit
July 18, 2016

SECTION 000110 – TABLE OF CONTENTS

END OF SECTION 000110

SECTION 011000 – PROJECT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Type of Contract.
3. Work under separate contracts.
4. Owner-furnished products.
5. Use of the premises.
6. Work restrictions.
7. Permits and fees.
8. Substitutions
9. Contract modification procedures.
10. Payment procedures.
11. Project management and coordination.
12. Submittal procedures.
13. Execution.
14. Closeout procedures.

1.2 PROJECT INFORMATION

A. Project Identification: Chubb Overland Park Branch and ESIS Relocation, Perkins+Will Project Number 028793.002

1. Project Location: 34 Corporate Woods, Suite 400, 10950 Grandview Drive , Overland Park KS 66210

B. Owner: Chubb, 15 Mountain View Road, Warren NJ 07059

1. Owner's Representative: CB Richard Ellis (CBRE) as agent for the owner.

C. Architect: Architect: Perkins + Will, The Wrigley Building, 410 North Michigan Avenue, Suite 1600, Chicago, Illinois, 60611.

D. Scope of Work: The scope of work is defined by the Drawings and Specifications prepared by the Architect and other Consultants.

1.3 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract between the landlord and the general contractor.

B. Drawings and Specifications prepared by Architect and Consultants.

C. Insurance as required by the Landlord and the Owner

1.4 WORK UNDER SEPARATE CONTRACTS

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

1.5 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.

B. Owner-Furnished, Contractor-Installed Products:

1. Carpet tile (CPT-1) and adhesive; resilient flooring (RF-1) and adhesive.
2. Audio Visual: Owner's vendor to furnish audio-visual equipment.

C. Owner-Furnished, Owner-Installed Products:

1. Low Voltage: Owner's vendor to furnish and install low voltage voice/data cabling and racks and other items in the telephone room.
2. Security: Owner's vendor to furnish and install a security system exclusive of associated locking hardware.

1.6 USE OF THE PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which Work is indicated.

B. Building Access: Coordinate with Landlord for access to the building, use of entrances, loading docks and freight elevators.
1. Schedule deliveries to minimize use of driveways and entrances by construction operations.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Use of Existing Building:
1. Maintain access to all required exits and exit passageways. Provide temporary protected hallways or passageways as necessary to required exits and exit passageways. Provide temporary illuminate exit signs, as required, for any temporary change in exit paths for exiting of partial or adjacent occupancies.

2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and Landlord.
3. Coordinate with Landlord for the use of building toilet room facilities.

1.7 WORK RESTRICTIONS

A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by other Tenants or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated. Notify Owner not less than two days in advance of proposed utility interruptions.

B. Noise, Vibration, and Odors: Coordinate operations that may cause high levels of noise and vibration, odors, or other disruption to Tenants occupancy with Landlord. Notify Landlord not less than two days in advance of proposed disruptive operations.

1.8 PERMITS AND FEES

A. The Contractor is to apply and pay for building and all other permits, including but not necessarily limited to; building, foundation, utility, street, barricade, environmental and governmental permits and inspection fees. The Architect will assist in the application of Building permits.

1.9 ALTERNATES

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

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

1.10 SUBSTITUTIONS

A. Definition: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. 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.

C. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   1. Statement indicating why specified product, fabrication or installation is being considered for substitution.
   2. 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.
   3. 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.
   4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   5. Samples, where applicable or requested.
   6. Certificates and qualification data, where applicable or requested.
   7. Cost information, including a proposal of change, if any, in the Contract Sum.
   8. 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.
   9. 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.

D. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within five days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within five days of receipt of request, or five days of receipt of additional information or documentation, whichever is later.

E. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

F. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.11 CONTRACT MODIFICATION PROCEDURES

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

B. MINOR CHANGES IN THE WORK

1. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

C. PROPOSAL REQUESTS
1. 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.
2. Within 10 days 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.
3. Contractor Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
4. Proposal Request Form: Use Architect's Form for Proposal Requests.

D. ALLOWANCES
1. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
    a. Include installation costs in purchase amount only where indicated as part of the allowance.
    b. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
    c. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit cost allowances.
    d. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
2. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 10 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 10 days after such authorization.
    a. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
    b. No change to Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated.

E. CHANGE ORDER PROCEDURES

1. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor.

F. CONSTRUCTION CHANGE DIRECTIVE
1. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

1.12 PAYMENT PROCEDURES

A. Schedule of Values
1. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule
2. 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.

3. Submit the schedule of values to Architect at earliest possible date, but no later than five days before the date scheduled for submittal of initial Applications for Payment.
4. 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.
   a. Identification: Include the following Project identification on the schedule of values:
      1) Project name and location.
      2) Name of Architect.
      3) Architect's project number.
      4) Contractor's name and address.
      5) Date of submittal.
   b. Arrange schedule of values consistent with format of AIA Document G703.
   c. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
      1) Related Specification Section or Division.
      2) Description of the Work.
      3) Name of subcontractor.
      4) Name of manufacturer or fabricator.
      5) Name of supplier.
      6) Change Orders (numbers) that affect value.

7) Dollar value of the Labor, Materials, and Equipment, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

d. 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.

e. 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.

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

f. 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.

g. 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.

h. 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.

1) 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.

i. 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.

B. Applications for Payment

1. 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.
2. Payment Application Times: Submit Application for Payment to Architect at dates agreed upon by Architect and Owner.
   a. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
3. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
4. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor.
   a. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
   b. 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.
   c. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

5. 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.
6. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
7. 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.
    a. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
    b. When an application shows completion of an item, submit conditional final or full waivers.
    c. Owner reserves the right to designate which entities involved in the Work must submit waivers.
    d. 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.
    e. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
8. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
    a. List of subcontractors.
    b. Schedule of values.
    c. Contractor's construction schedule (preliminary if not final).
    d. Schedule of unit prices.
    e. Copies of building permits.
    f. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
    g. Initial progress report.
    h. Report of preconstruction conference.
    i. Certificates of insurance and insurance policies.
    j. Performance and payment bonds.
    k. Data needed to acquire Owner's insurance.
9. 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.
    a. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
    b. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
10. 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:

11. Evidence of completion of Project closeout requirements.
12. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
13. Updated final statement, accounting for final changes to the Contract Sum.
14. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
15. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
16. AIA Document G707, "Consent of Surety to Final Payment."
17. Evidence that claims have been settled.

1.13 PROJECT MANAGEMENT AND COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications and Drawings 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.
4. Coordinate construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

C. 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. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
f. Indicate required installation sequences.
g. 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.

D. Requests for Information and/or Interpretation
1. 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.
2. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

E. Project Meetings
1. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
2. 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.
3. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
4. 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.

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

G. 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.

H. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, the contractor shall invite on a regular basis or for specific dates, other design consultants, owner's consultants, furniture dealers and other parties required to conclude matters relating to

the Work. The contractor may invite subcontractors only for specific agenda items if a separate coordination meeting is not required.

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.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

I. Coordination Meetings: Conduct Project coordination meetings as required or as requested by the Owner or Architect. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

J. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, and as required per the project schedule prior to Substantial Completion. Project close-out meetings may coincide with regularly scheduled progress meetings.

1.14 SUBMITTAL PROCEDURES

A. Definitions
1. 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."
2. 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."

B. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule.

C. Submittal Administrative Requirements
1. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals, shop drawings and project record drawings.
   a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   b. Complete and submit Architect’s Electronic File Transfer Agreement.
2. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   b. 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.
   c. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No

extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

4. Submittal Identification: Place a permanent label or title block on each submittal item for identification.
    a. Indicate name of firm or entity that prepared each submittal on label or title block.
    b. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
    c. Include the following information for processing and recording action taken:
        1) Project name.
        2) Date.
        3) Name of Architect.
        4) Name of Contractor.
        5) Name of subcontractor.
        6) Name of supplier.
        7) Name of manufacturer.
        8) Submittal number or other unique identifier including the specification section number and revision identifier.
        9) Drawing number and detail references, as appropriate.
        10) Location(s) where product is to be installed, as appropriate.
5. Options: Identify options requiring selection by Architect.
6. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
7. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
8. 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.
9. 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.

D. Submittal Procedures

1. Post electronic submittals as PDF electronic files on Architect’s or Contractor’s website or via e-mail.
    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
3. 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 is based on Architect's electronic CAD drawings that are otherwise permitted.
    a. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
        1) Identification of products.
        2) Schedules.
        3) Compliance with specified standards.
        4) Notation of coordination requirements.
        5) Notation of dimensions established by field measurement.
        6) Relationship and attachment to adjoining construction clearly indicated.
        7) Seal and signature of professional engineer if specified.

4. 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.
    a. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
    b. Identification: Attach label on unexposed side of Samples that includes the following:
        1) Generic description of Sample.
        2) Product name and name of manufacturer.
        3) Sample source.
        4) Number and title of appropriate Specification Section.
    c. 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.
        1) 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.
        2) Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
    d. 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.
        1) Number of Samples: Submit three (3) 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 two (2) sets with options selected.
    e. 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.
        1) Number of Samples: Submit three (3) sets of Samples. Architect will return two (2) Sample sets.
            a) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
            b) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least four (4) sets of paired units that show approximate limits of variations.
5. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

7. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
8. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
9. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
10. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
11. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
12. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
13. Tests and Inspections: Comply with requirements specified in Section 01 14 00 - Quality Requirements.
14. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
15. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

E. Contractors' Review
1. 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.
2. 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.

F. Architects' Action
1. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. 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, as follows:**

A – NO EXCEPTIONS: When the Architect marks a submittal "No Exceptions," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.

B - EXCEPTIONS AS NOTED: When the Architect marks a submittal "Exceptions As Noted," the Work covered by the submittal may proceed provided it complies with

notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.

C – REVISE AND RESUBMIT: 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. Repeat if necessary to obtain different action mark.

D - REJECTED: When the Architect marks a submittal "Rejected," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The submittal does not conform to the design concept or meet requirements of the Contract Documents.

E – FOR INFORMATION ONLY: Where a submittal is marked “For Information Only”, the Architect will not return the submittal unless it does not comply with specified requirements.

3. F – NOT REVIEWED: Submittals not required by the Contract Documents will be marked “Not Reviewed”, the Architect will return the submittal without action. Submittals are reviewed for conformance with the design concept expressed in the Contract Documents. Review is not for the purpose of confirming or approving: (a) deviation from the Contract Documents, including but not limited to deviation with reference to material, quantity, location, quality, dimension, or orientation (except as expressly annotated in writing by the Architect herein), (b) means, methods, sequences, or techniques of construction (unless expressly called for in the Contract Documents and herein expressly highlighted for review and approval by the Architect), (c) safety of the contractor(s) work, work plan, procedures, workers or of the site, (d) any clarification of a patent or latent ambiguity or defect in the Contract Documents, or (e) the procurement or request for any labor, materials or other expense of the contractor(s) which is in addition to that previously approved by the Owner. The Contractor shall be and shall remain responsible for: (a) compliance with the Contract Documents, (b) coordination of the Work (including amongst various trades), (c) performing the Work in a safe and satisfactory manner, (d) confirming and correlating quantity and dimensions, and (e) the construction schedule.
4. 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.
5. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
6. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
7. Submittals not required by the Contract Documents may be returned by the Architect without action.

1.15 EXECUTION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated,

for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.
2. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
3. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

B. Construction Layout:
   1. Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the existing building size and configuration and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
   2. Lay out work as required to allow the Architect to review prior to beginning of Work. Include the following:
      a. Partition Layout
      b. Door locations.
      c. Millwork layout
      d. Layout of major equipment
      e. Coordinate layout of work by other contractors.
      f. Typical electrical outlet locations.
      g. Electrical outlets located in millwork.
      h. Start points for acoustical ceiling grids.

C. Installation
   1. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
      a. Make vertical work plumb and make horizontal work level.
      b. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
      c. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
      d. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.
   2. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
   3. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
   4. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
   5. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
   6. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
   7. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located

and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
b. Allow for building movement, including thermal expansion and contraction.
c. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

8. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

D. Cutting and Patching

1. Definitions
   a. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
   b. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.
2. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
3. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
4. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
5. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
6. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   a. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
7. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
8. Temporary Support: Provide temporary support of work to be cut.
9. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
10. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting with Owner.

11. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
12. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
    a. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
    b. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
    c. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
    d. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
    e. Proceed with patching after construction operations requiring cutting are complete.
13. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
    a. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
    b. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
        1) Clean piping, conduit, and similar features before applying paint or other finishing materials.
        2) Restore damaged pipe covering to its original condition.
    c. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
        1) Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
    d. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
    e. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
14. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

E. Progress Cleaning
    1. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

a. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
b. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
c. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

2. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   a. Remove liquid spills promptly.
   b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
4. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
5. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
6. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
7. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
8. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

F. Protection of Installed Construction
   1. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
   2. Comply with manufacturer's written instructions for temperature and relative humidity.

G. Correction of the Work
   1. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
      a. Repairing includes replacing defective materials, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
   2. Restore permanent facilities used during construction to their specified condition.
   3. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
   4. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
   5. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

1.16 CLOSEOUT PROCEDURES

A. Substantial Completion

1. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, the contractor to complete the following. List items below that are incomplete in request.
    a. Prepare a list of items to be completed and corrected (punch list), and the value of items on the list.
    b. Advise Owner of pending insurance changeover requirements.
    c. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
    d. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
    e. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
    f. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
    g. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
    h. Complete startup testing of systems.
    i. Submit test/adjust/balance records.
    j. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
    k. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
    l. Complete final cleaning requirements, including touchup painting.
    m. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
2. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
    a. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
    b. Results of completed inspection will form the basis of requirements for Final Completion.

B. Final Completion
1. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
    a. Submit a final Application for Payment.
    b. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
    c. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
    d. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

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

C. List of Incomplete Items (Punchlist)
1. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
    a. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
    b. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
2. 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.

D. Warranties
1. Submittal Time: Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
2. Partial Occupancy: Submit properly executed warranties within ten days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
3. Organize warranty documents into an orderly sequence based on the Table of Contents of the Project Manual.
    a. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
    b. 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.
    c. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Provide additional copies of each warranty to include in operation and maintenance manuals.

E. Final Cleaning
1. General: Provide final cleaning. Conduct cleaning and waste removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
2. 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.
    a. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

1) Remove tools, construction equipment, machinery, and surplus material from Project site.
2) Clean exposed interior hard surfaced finishes to a dirt free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
3) Clean all woodwork surfaces. Clean inside as well as outside of all woodwork cabinets.
4) Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
5) Sweep concrete floors broom clean in unoccupied spaces.
6) Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
7) Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
8) Remove labels that are not permanent.
9) Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    a) Do not paint over UL and similar labels, including mechanical and electrical nameplates.
10) Replace parts subject to unusual operating conditions.
11) Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
12) Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
13) Clean ducts, blowers, and coils if units were operated without filters during construction.
14) Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
15) Leave Project clean and ready for occupancy.

3. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

F. Repair of the Work
1. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
2. 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.
    a. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

b. 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.
   1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
c. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
d. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

1.2 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 or Landlord.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Landlord's property, demolished materials become the Contractor's property and are to be removed from the site with further disposition at the Contractor's option. Storage or sale of removed items or materials on-site will not be permitted

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all laws, ordinances, rules and regulations of governmental authorities having jurisdiction over the demolition work.

1. Comply with governing EPA notification regulations before starting selective demolition.
2. Comply with hauling and disposal regulations of authorities having jurisdiction.

3. Provide protection of persons and property in accordance with ANSI/NFPA 241.

1.5 FIELD CONDITIONS

A. The Drawings indicate existing construction diagrammatically. Verify at the project site exact locations, sizes, extent, quantities and conditions of the existing construction to be removed or to remain.

B. Other Tenants will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Tenants and Landlord's operations will not be disrupted. Notify Landlord not less than 72 hours in advance of activities, that may affect Tenant's and Landlord's operations or in accordance with the Landlord's Rules and Regulations for Construction, whichever is stricter.

C. No liability is to be attached to the Owner or to Architect through bidder or Contractor for reliance on information indicated on Drawings of existing construction.

D. Maintain access to existing walkways, corridors, paths of egress, exit ways and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

E. Provide all temporary enclosures, lights, etc., required to protect the workmen, Owner's personnel and others from injury due to the selective demolition work. Provide free and safe passage of persons to and from building areas which are to remain.

F. Provide shoring and bracing necessary to protect existing building construction to remain from damage by movement or collapse during the selective demolition operations. Maintain shoring and bracing until completion of work, remove when no longer required.

G. Owner assumes no responsibility for condition of areas to be selectively demolished. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

H. Verify with Landlord items to be removed by Landlord prior to commencement of demolition work.

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

J. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work. If suspected hazardous materials are encountered, do not disturb; immediately notify Owner

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

L. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 COORDINATION

Retain this article if selective demolition will interfere with Owner's operations; insert phasing requirements if applicable.

A. Arrange selective demolition schedule so as not to interfere with Landlord's and Tenant's operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Review record documents of existing construction provided by Landlord. Landlord 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. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off 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 on Drawings to be removed.
4. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
5. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
6. Equipment to Be Removed: Disconnect and cap services and remove equipment.
7. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
8. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
9. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
10. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

C. Protect and maintain existing utility lines which are to remain in service in such a manner as to avoid interruption of these lines. Cap all utility lines terminated by the selective demolition work.

D. Coordinate locations of existing utility and building services located in walls, floors and ceilings prior to the start of work. Record all such utilities and services on as-built record drawings.

3.3 STRUCTURAL ELEMENTS

A. Protect all building structural elements from damage during demolition work.

B. Prior to any removal or partial removal of any structural elements, verify with Landlord and Structural engineer.

3.4 EXTERIOR WALL

A. Protect all building enclosure elements from damage during the demolition work.

3.5 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. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Adhesives, mechanical fasteners and suspension systems:
1. Remove all adhesives related to items that have been indicated to be removed.
2. Where floor coverings on concrete slabs are being removed, remove all adhesives and leave the concrete finish ready to receive new floor coverings.
3. Remove all mechanical fasteners related to items and systems indicated.
4. Remove all suspension elements and systems for items that are indicated to be removed and not replaced.

C. In addition to what is specifically shown on the Drawings, remove items as necessary to provide access or to allow alterations and new work to proceed. Including such items as:

1. Removal of abandoned items and items serving no useful purpose, such as framing, blocking, abandoned piping, conduit, ductwork, wiring, switches, junction boxes, fittings, anchors, fasteners and appurtenances associated with the removed or abandoned items or construction for a make ready condition for new construction or patching.
2. Removal of unsuitable or extraneous materials not marked for salvage.
3. Cleaning of surfaces and removal of surface finishes as needed to install new work and finishes.

D. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area.
5. Protect items from damage during transport and storage.

E. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Floor Coverings: Remove carpet floor coverings and adhesive. Do not use methods requiring solvent-based adhesive strippers.

B. Floor Coverings: Remove ceramic/porcelain coverings and mortar/grout. Return floor surface to smooth condition.

C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings. Do not use methods requiring solvent-based adhesive strippers.

D. Window Blinds: Remove and dispose of window blinds.

E. If requested by Landlord - Removal and Storage of Existing Doors and Door Frames for Reuse:

1. Carefully remove existing doors and door frames indicated for salvage on the Drawings.
2. Leave all hardware on doors and frames.
3. Provide covering and padding to protect finish surfaces and hardware from damage.
4. Provide plastic banding at top, center and bottom of doors and door frames to maintain doors in frames.
5. If doors are removed from frames, provide temporary spreader bars at the bottom of each frame.
6. Transport doors and frames to Owner’s storage area.
7. Store doors and door frames in upright position with protective padding between units.

F. If requested by Landlord - Removal and Storage of Existing Door Hardware for Reuse:

1. Remove existing door hardware items taking not do damage each item and the existing door and door frame.
2. Place each hardware set from a door into an individual box marked with a description of the contents.
3. Transport hardware sets to Owner's secure storage area designated by Owner.

3.7 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls that are to remain with a compatible masonry patching material as approved by the Architect, applied according to manufacturer's written recommendations.

C. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

D. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the existing and new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other specification sections.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

E. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.8 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.

B. Clean building interior areas of selective demolition of dust, dirt, and debris as a result of selective demolition, leave areas broom clean.

C. Remove containers, equipment, temporary construction and protection used for selective demolition.

END OF SECTION 024119

SECTION 035412 - CEMENT UNDERLAYMENT

PART 1 - GENERAL

A. Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Hydraulic-cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.
   2. Gypsum-cement-based, self-leveling underlayment for application below interior floor coverings.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.

C. Sound Transmission Characteristics: Where indicated, provide hydraulic-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place cement-based and gypsum-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

1.7 COORDINATION

A. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.

PART 2 - PRODUCTS

2.1 GYPSUM-CEMENT-BASED UNDERLAYMENTS

A. Underlayment: Gypsum-cement-based, self-leveling product that can be applied in minimum uniform thickness of 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.

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

    a. Allied Custom Gypsum; AccuCrete.
    b. Ardex; GS-4 Self-Leveling Repair Underlayment; LU-100 Self-Leveling Flooring Underlayment; TL Wood Self-Leveling Flooring Underlayment.
    c. Bonsal American, an Oldcastle company; ProSpec Level Set G.
    d. USG Corporation; Levelrock 2500; Levelrock 3500; Levelrock 4500; Levelrock Quik-Top; Levelrock RH; Levelrock Commercial RH; Levelrock CSD.

2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
3. Compressive Strength: Not less than **4000 psi (27.6 MPa)** at 28 days when tested according to ASTM C 109/C 109M.
4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

C. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

2.2 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

A. Underlayment: Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges to match adjacent floor elevations.

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

a. Ardex; K-15 Self-Leveling Underlayment Concrete.
b. BASF Construction Chemicals, Inc.; Chemrex Self-Leveling Underlayment; MBT Mastertop 110 Plus Underlayment.
c. Bonsal American, an Oldcastle company; ProSpec Level Set 200; ProSpec Level Set 300; ProSpec Level Set LW-60.
d. MAPEI Corporation; Novoplan Easy; Novoplan 2; Ultraplan Easy; Ultraplan 1 Plus.
e. Specialty Construction Brands, Inc., an H.B. Fuller company; TEC Smooth Start; TEC EZ Level.
f. USG Corporation; Levelrock SLC 300; Levelrock SLC 400].

2. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
3. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

C. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

2.3 ACCESSORIES

A. Sound Mat:

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

a. Allied Custom Gypsum; AccuQuiet.
b. Dura Undercushions Ltd.; Duracoustic.

c. USG Corporation; Levelrock Brand Sound Reduction Mat.

B. Sound Reduction Board:

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

a. USG Corporation; Levelrock Brand Sound Reduction Board.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.

1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.

C. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

1. Install underlayment reinforcement recommended in writing by manufacturer.

D. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.

E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

F. Sound Control Mat and Board: Install sound control materials according to manufacturer's written instructions.

1. Do not install mechanical fasteners that penetrate through the sound control materials.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.
1. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

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

END OF SECTION 035416

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for countertops.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Miscellaneous angles, shapes and fabrications shown on the Drawings.
5. All anchors, framing, fasteners and accessories for installation of the above.
6. Design calculations for those items required to have such.

1.2 COORDINATION

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

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

1.3 PERFORMANCE REQUIREMENTS

A. Design metal fabrications, including engineering calculations prepared by a qualified Structural Engineer, using structural performance requirements and design criteria indicated herein.

B. Contractor is responsible for the engineering and design of all components and materials, as well as the installation of the metal fabrications.

C. Supports for Countertops:

1. Dead load of counters.

2. Uniform Load: 50 pounds per linear foot of counter.
3. Concentrated Load Downward: 200 pounds at any point on the counter.
4. Limit deflection to L/360 between supports.

D. Information on Drawings and in the Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated on the Drawings by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria specified herein subject to verification as specified.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's written approval and only to the extent needed to comply with performance requirements.

1.4 SUBMITTALS

A. Shop Drawings: Show fabrication and installation details.
1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. Where fabrications require calculations, provide shop drawings sealed and signed by the same Structural Engineer that prepared calculations.

1.5 QUALITY ASSURANCE

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

B. Welding Qualifications: Qualify procedures and personnel according to the following:

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

1.6 FIELD CONDITIONS

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

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous

construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 METALS

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

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

2.2 FASTENERS

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

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

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3.

G. Lag Bolts: ASME B18.2.1.

H. Wood Screws: Flat head, ASME B18.6.1.

I. Plain Washers: Round, ASME B18.22.1.

J. Lock Washers: Helical, spring type, ASME B18.21.1.

K. Power Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with capability to sustain, without failure, a load equal to ten (10) times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency. Provide manufacturer's substantiating data for each type and condition used as part of submittals.

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer with a VOC content of 3.5 lb/gal. or less when calculated according to 40CFR59, Subpart D (EPA Method 24).
2. Use primer containing pigments that make it easily distinguishable from zinc rich primer.
3. Provide one of the following:
   a. Carboline Company, OEM, St. Louis, MO 63144.
   b. Tnemec, Company, Inc., Series 10-1009, Kansas City, MO 64141.
   c. PPG Amercoat 185H.

B. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

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

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

2.4 FABRICATION, GENERAL

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

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

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

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

E. Weld corners and seams continuously to comply with the following:

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

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

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

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

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

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Furnish inserts if units are installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition shop drawings.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports with zinc rich primer where indicated.

2.6 FINISHES, GENERAL

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

B. Finish metal fabrications after assembly.

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

2.7 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items **not indicated to be galvanized** unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

D. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Interiors (SSPC Zone 1A): SSPC-SP-3, Power Tool Cleaning.

E. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA-1, Paint

Application Specification No.1, Shop, Field, and Maintenance Painting of Steel, for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

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

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

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

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

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

B. Anchor supports for ceiling hung toilet partitions, operable partitions and overhead doors securely to, and rigidly brace from, building structure.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes rough carpentry, including the following:

1. Wood blocking and nailers for the anchor or support of other items or construction of every description including items reasonably implied but not specifically mentioned on the Drawings or specified herein to render the work secure and complete.
2. Miscellaneous plywood panels and backing.
3. Wood fire retardant treatment for lumber and plywood.
4. Anchors, fasteners and hardware for the above.

1.2 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

D. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with

requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 QUALITY ASSURANCE

A. Grading Rules:

1. Provide lumber grading rules and wood species conforming with the DOC Voluntary Product Standard PS 20. Grading rules of the following associations also apply to materials produced under their supervision:
   a. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
   b. Southern Pine Inspection Bureau (SPIB).
   c. West Coast Lumber Inspection Bureau (WCLIB).
   d. Western Wood Products Association (WWPA).
2. Provide plywood conforming to the following:
   a. Softwood Plywood - Construction and Industrial: DOC Product Standard.
   b. PS 1.
   c. Hardwood Plywood: DOC Product Standard PS 51.

B. Grading Marks: Identify all lumber by official grade mark.

1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
   a. S-Dry: Maximum 19 percent moisture content.
   b. MC-5 or KD: Maximum 15 percent moisture content.
   c. Dense.
2. Softwood Plywood: Maximum grade trademark of the APA The Engineered Wood Association.
   a. Type, grade, class and identification index.
   b. Inspection, testing or grading agency.

C. Testing: ASTM E 84, maximum 25 flame spread rating.

D. Requirements of Regulatory Agencies:

1. Fire Hazard Classification: Underwriters' Laboratories, Inc., for treated lumber and plywood.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber:

1. Dimension:
   a. Specified lumber dimensions are nominal.
   b. Actual dimensions conform to industry standards established by the American Lumber Standards Committee and the rules writing agencies.
2. Moisture Content: 19 percent maximum at time of permanent closing in of building or structure for lumber 2 inches or less nominal thickness.
3. Surfacing: Surface four sides (S4S), unless otherwise shown or specified.
4. Blocking and Nailers lumber, No. 2 Grade, 2 inch to 4 inch thick, 2 inch to 4 inch wide, any commercial softwood species, unless otherwise shown or specified.

B. Plywood:

1. Panels and fabrications for exterior installations and in conjunction with roof and wall construction; Exterior graded plywood B-B EXT - APA, square edged, thickness as shown on the Drawings or if not shown provide 3/4 inch thick panels.
2. Telephone, Electrical and Miscellaneous Equipment Backing Panels: Interior Graded Plywood, C-D INT-APA, with exterior glue in areas where moisture is present, touch sanded, fire retardant treated, square edged, 3/4 inch thick unless noted otherwise on the Drawings.

C. Fire Retardant Treated Wood:

1. Lumber: AWPA C20.
2. Plywood: AWPA C27.
3. Provide materials with surface burning characteristics indicated below when tested in accordance with ASTM E 84.
   a. Flame Spread: 25.
   b. Fuel Contributed: 15.
   c. Smoke Developed: 0.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

D. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.3 MISCELLANEOUS LUMBER

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

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.5 FASTENERS

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

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

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

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Do not splice structural members between supports unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- (38-mm actual-) thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.

G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.

J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

K. Wood Ground, Sleeper, Blocking, and Nailer Installation

1. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
2. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
3. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

L. Plywood Panels and Backing:

1. Provide miscellaneous plywood panels and backing (sheathing) for attachment of other items of construction.
2. Attach to substrates as required to support applied loading and in conformance with the applicable recommendations of the current edition of the APA Design/ Construction Guide - Residential and Commercial.
3. Coordinate locations of plywood panels and backing with other work requiring prior installation for support or anchoring.

M. Anchoring: Anchor as shown and to comply with the Recommended Nailing Schedule of referenced framing standard and with AFPA, American Forest & Paper Association, Design Specifications for Wood Construction.

N. Fire Retardant Treated Wood Products:

1. Provide fire retardant treated wood for all blocking and nailers where shown on the Drawings and required by local codes.
2. Apply two brush coats of same treatment used in original treatment to all sawn or cut surfaces of fire treated lumber.

END OF SECTION 061000

SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Architectural wood cabinets.
2. Standing and running trim
3. Wood door frames
4. Wood paneling
5. Ornamental woodwork
6. Wood furring, blocking, shims, and hanging strips for installing architectural woodwork unless concealed within other construction before cabinet installation.
7. Shop finishing of architectural woodwork.

1.2 SUBMITTALS

A. Product Data: For each type of product, including wood products, fire-retardant-treated materials, adhesives, cabinet hardware and accessories and finishing materials and processes.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for electrical outlets and other items installed in architectural woodwork.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Apply AWI Quality Certification Program label to Shop Drawings.
6. Apply WI Quality Certification Program label to Shop Drawings.

C. Samples:

1. Lumber for transparent finish, not less than 5 inches (125mm) by 12 inches (300mm), for each species and cut, finished on one side and one edge.
2. Lumber for opaque finish, not less than 5 inches (125mm) by 12 inches (300mm), for each finish system and color.
3. Panels for transparent finish, not less than 12 inches (300mm) by 12 inches (300mm), for each species, cut and finish system, finished on one side and one edge. Include a veneer seam in samples.
4. Panels for opaque finish, not less than 5 inches (125mm) by 12 inches (300mm), for each finish system and color.
5. Veneer leaves representative of, and selected from, flitches to be used for transparent finished woodwork.
6. Samples for verification for plastic laminates, 8 by 10 inches (200 by 250 mm) for each type, color, pattern, and surface finish.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer and fabricator.

B. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates or WI Certified Compliance Program certificates.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program or Shop is a licensee of WI's Certified Compliance Program.

B. Installer Qualifications: Fabricator of products.
1. 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. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

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

B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity as recommended by the Architectural Woodwork Standards and at a minimum between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

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

PART 2 - PRODUCTS

2.1 ARCHITECTURAL WOODWORK FABRICATORS

A. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of architectural woodwork.

2.2 ARCHITECTURAL WOOD CABINETS, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural wood cabinets indicated for construction, finishes, installation, and other requirements.

2.3 WOOD CABINETS FOR TRANSPARENT FINISH

A. Grade: Premium.

B. Type of Construction: Frameless, unless indicated otherwise on the drawings.

C. Cabinet and Door and Drawer Front Interface Style: Flush overlay, unless indicated otherwise on the drawings.

D. Wood for Exposed Surfaces: As indicated.

1. Species and cut: As indicated.
2. Grain Direction: As indicated.
3. Matching of Veneer Leaves: Book match unless indicated otherwise on the drawings.
4. Veneer Matching within Panel Face: Balance match unless indicated otherwise on the drawings.

E. Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.

    a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.

2. Drawer Subfronts, Backs, and Sides: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
3. Drawer Bottoms: Hardwood plywood.

F. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.4 WOOD CABINETS FOR OPAQUE FINISH

A. Grade: Premium.

B. Type of Construction: Frameless.

C. Cabinet and Door and Drawer Front Interface Style: Flush overlay.

D. Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: Melamine or plastic laminate.

a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.

2. Drawer Sides and Backs: Solid-hardwood lumber.
3. Drawer Bottoms: Hardwood plywood.

E. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.5 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

B. Grade: Custom.

C. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

E. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGL.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS or Grade VGS.
4. Edges: Same as surface material unless indicated otherwise or with PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
5. Pattern Direction: As indicated.

F. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Solid-hardwood lumber.
3. Drawer Bottoms: Hardwood plywood.

G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated by laminate manufacturer's designations.

2.6 PANELING, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of flush wood paneling (wood-veneer wall surfacing) indicated for construction, finishes, installation, and other requirements.

2.7 FLUSH WOOD PANELING

A. Grade: Premium.

B. Wood Species and Cut: As indicated on Drawings.

C. Matching of Adjacent Veneer Leaves: Book Match.

D. Matching within Panel Face: Balance Match.

E. Matching of Adjacent Veneer Leaves and within Panel Face: Book Match.

F. Panel-Matching Method: Made-to-order, sequence-matched panels within each separate area.

G. Vertical Panel-Matching Method: As indicated on Drawings.

H. Panel Core Construction: Hardwood veneer-core plywood; Particleboard or medium-density fiberboard; Fire-retardant particleboard or fire-retardant, medium-density fiberboard.

1. Thickness: 3/4 inch (19 mm) or as indicated on Drawings.

I. Exposed Panel Edges: Wood-veneer matching faces or as indicated on Drawings.

J. Fire-Retardant-Treated Paneling: Panels shall consist of wood-veneer and fire-retardant particleboard or fire-retardant, medium-density fiberboard. Panels shall have a flame-spread index of 75 or less and a smoke-developed index of 450 or less per ASTM E 84 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

K. Assemble panels by gluing and concealed fastening.

2.8 STANDING AND RUNNING TRIM, DOOR FRAMES, ORNAMENTAL WOODWORK

A. Grade:
1. Premium grade for all shop finished products.
2. Custom grade for all field finished products.

B. Species and cut for transparent finish: As indicated on the Drawings.

C. Solid Hardwood Lumber for Opaque Finish: Any close-grain hardwood.

D. Hardwood Veneer for Opaque Finish: Natural Birch or Poplar, Plain sawn.

2.9 WOOD MATERIALS

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

1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches (75 mm) wide.
2. Wood Moisture Content: 5 to 10 percent or as recommended by “Architectural Woodwork Standards” for specific region.

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

1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.

2. Softwood Plywood: DOC PS 1, medium-density overlay.
3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
4. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.10 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
4. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.

C. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

1. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2070 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 and 225 lbf (1100 and 1000 N), respectively.
2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1720 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf (1100 and 780 N), respectively.

D. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.11 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.

E. Catches: Magnetic catches, BHMA A156.9, B03141 or Push-in magnetic catches, BHMA A156.9, B03131.

F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081; BHMA A156.9, B04102; with shelf brackets, B04112.

G. Shelf Rests: BHMA A156.9, B04013; metal.

H. Drawer Slides: BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel or epoxy-coated steel with polymer rollers.
2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
3. For drawers not more than 3 inches (75 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1.
4. For drawers more than 3 inches (75 mm) high but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1.
5. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-100.
6. For computer keyboard shelves, provide Grade 1.
7. For trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide, provide Grade 1HD-100. For larger trash bins, provide Grade 1HD-200.

I. Plastic or Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

J. Door Locks: BHMA A156.11, E07121.

K. Drawer Locks: BHMA A156.11, E07041.

L. Door and Drawer Silencers: BHMA A156.16, L03011.

M. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick unless otherwise indicated.

N. Decorative Glass for Cabinet Doors: As indicated on the drawings.

O. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

P. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
2. Satin Stainless Steel: BHMA 630.

Q. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.12 SHELVING HARDWARE

A. Adjustable Shelf Supports: Heavy duty slotted steel, BHMA B84102

B. Shelf Brackets: Heavy duty double and triple hooked steel brackets, BHMA B84112.

2.13 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber or Fire-retardant-treated softwood lumber as required, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement or Contact cement; Resorcinol where required.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.14 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Arrange paneling in shop or other suitable space in proposed sequence for examination by Architect. Mark units with temporary sequence numbers to indicate position in proposed layout.

1. Lay out one elevation at a time if approved by Architect.
2. Notify Architect seven days in advance of the date and time when layout will be available for viewing.
3. Provide lighting of similar type and level as that of final installation for viewing layout unless otherwise approved by Architect.
4. Rearrange paneling as directed by Architect until layout is approved.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets: 1/16 inch (1.5 mm) unless otherwise indicated.

D. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

E. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

F. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.15 SHOP FINISHING

A. General: Finish architectural wood cabinets at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

B. General: Shop finish transparent-finished architectural wood cabinets at fabrication shop as specified in this Section. Refer to Section 099123 "Interior Painting" for field finishing opaque-finished architectural woodwork.

C. General: Drawings indicate items that are required to be shop finished. Finish such items at fabrication shop as specified in this Section. Refer to Section 099123 "Interior Painting" for field finishing architectural woodwork not indicated to be shop finished.

D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets and paneling.

E. Transparent Finish:

1. Grade: Premium.
2. Finish: System - 5, conversion varnish.
3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to cabinets made from closed-grain wood before staining and finishing.
4. Staining: Match approved sample or Architect’s sample for color.
5. Filled Finish for Open-Grain Woods: After staining, apply wash-coat sealer and allow to dry. Apply paste wood filler and wipe off excess. Tint filler to match stained wood.

6. Sheen: Satin, 31-45, Semigloss, 46-60 or Gloss, 61-100 gloss units measured on 60-degree gloss meter per ASTM D 523. Provide sheen as indicated on the drawings.

F. Opaque Finish:

1. Grade: Premium.
2. Finish: System - 5, conversion varnish.
3. Color: Match Architect's sample.
4. Sheen: Satin, 31-45, Semigloss, 46-60 or Gloss, 61-100 gloss units measured on 60-degree gloss meter per ASTM D 523. Provide sheen as indicated on the drawings.

PART 3 - EXECUTION

3.1 PREPARATION

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

B. Before installing woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install woodwork to comply with same grade as item to be installed.

B. Assemble woodwork and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

1. For shop finished items use filler matching finish of items being installed.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish.

G. Install paneling level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Install with no more than 1/16 inch in 96-inch (1.6 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.

1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding 1/32 inch (0.8 mm).

H. Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening unless covered by trim or otherwise indicated.

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

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.

J. Refer to Section 099123 "Interior Painting" for final finishing of installed architectural woodwork not indicated to be shop finished.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064113

SECTION 07 84 13 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Through-penetration firestop systems, including the following:

1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
4. Accessories and materials required for installation.

B. Related Sections:

1. Joint Sealants: 07 92 00
2. Gypsum board: Section 09 29 00
3. Division 21 Sections
4. Division 22 Sections
5. Division 23 Sections
6. Division 26 Sections
7. Division 28 Sections

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide tested through-penetration firestop systems produced and installed to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations in fire rated wall, partition, floor and roof assemblies, according to requirements indicated.

B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

1. Where through-penetration firestop systems protect penetrations located outside of wall cavities.
2. Where through-penetration firestop systems protect penetrations located outside fire-resistive shaft enclosures.

3. Where through-penetration firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
4. Where through-penetration firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide through-penetration firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

E. For through-penetration firestop systems exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

F. Systems and Product Selection:

1. When not shown on the Drawings, it is the Installing Contractor's undivided responsibility to select proposed systems and products which are appropriate for the types of penetrations, construction systems and the required fire resistance ratings shown on the Drawings and which comply with the requirements of this specification, subject to review by the Architect.
2. Proprietary products and UL designs when indicated on the Drawings are not intended to imply that products and UL designs of the manufacturer are required to the exclusion of equivalent products of other named acceptable manufacturers.

1.3 SUBMITTALS

A. Manufacturer's Literature: Materials description and installation instructions/ specifications for all materials used in the system.

B. Certification by through-penetration firestop system manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. Shop Drawings:

1. Submit floor plans indicating the locations of each type of item or group of items to receive a through-penetration system, indicate the proposed penetration system at each location.
2. For each type of penetration and construction show materials, installation methods, and relationships to adjoining construction. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.

a. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
b. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by through-penetration firestop system manufacturer's fire protection engineer with modifications marked.

D. Schedule: For each type of penetration and construction submit a schedule indicating the following:

1. Indicate each type of item or group of items to receive through-penetration firestoping. Include description of item or items; description of the floor, wall or roof construction; proposed through-penetration firestoping system.
2. Indicate the UL Fire Resistance Directory (Vol. 2) alpha-numeric identification system cross-referenced to the scheduled systems at the end of this section and the submitted shop drawings and product literature.

E. Samples: Submit manufacturer's standard color samples for selection by Architect for exposed to view through-penetration firestop systems.

F. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that their products comply with specified requirements.

G. Product Test Reports: From a qualified testing and inspecting agency indicating compliance through-penetration firestop system complies with requirements based on comprehensive testing of current products.

H. Installer Qualifications:

1. Submit written evidence in accordance with the "Quality Assurance" article to demonstrate capabilities and experience. Include list of completed projects with project names, addresses, names of Architect and Owners, and other information specified.
2. Installer's written certification from the Manufacturer stating that the Installer is approved and is a Certified or Licensed Installer of the proposed through-penetration firestop systems.

1.4 QUALITY ASSURANCE

A. Comply with all laws, ordinances, rules, regulations and orders of public authorities having jurisdiction over this part of the work.

B. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that complies with the following requirements and those specified under the "Performance Requirements" Article:

1. Through-penetration firestop systems tests are to be performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, Warnock Hersey, or other agency approved by the Architect, performing testing and follow-up inspection services for through-penetration firestop systems and is acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:
   a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
   b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by ITS, Warnock Hersey, or by another qualified testing and inspecting agency.

C. Information on the Drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation in accordance with Section 01 60 00 showing that the performance of proposed substitutions proposed to replace those shown or specified subject to acceptable to authorities having jurisdiction.

D.

E. Installer Qualifications:

1. The Installer is to be a firm regularly experienced in the installation of through-penetration firestop systems who has completed through-penetration firestop systems installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance for period of not less than five (5) consecutive years.
2. The Installer is also to be acceptable to the Through-Penetration Firestop System Manufacturer and is to also be certified by the manufacture to install the proposed through-penetration firestop systems and is to provide written evidence as part of the required submittals.
3. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

F. Single-Source Responsibility: Obtain through-penetration firestop systems for each type of penetration and construction condition indicated from a single manufacturer.

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

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi component materials.

B. Store and handle through-penetration firestop system materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1. Store materials, between 60 degrees F. and 80 degrees F. If exposed to lower temperature, restore to proper temperature before using.
2. Store materials, in dry area and protect. Replace damaged materials at Contractor's expense.

1.6 PROJECT/SITE CONDITIONS

A. Pre-installation Meeting: Meet with Installer, Architect, Sealant manufacturer's technical representative, if so requested, and other trades involved in coordination with sealant work at the Project Site. Review procedures and time schedule proposed for installation of through-penetration firestop systems in coordination with other work. Review each major through-penetration firestop systems application required on the Project.

B. Environmental Conditions:

1. Do not proceed with installation of through-penetration firestop systems under adverse environmental conditions or when temperatures are below or above manufacturer's recommended limitations for installation.
2. Proceed with the Work only when forecasted environmental conditions are favorable for proper cure and development by ambient temperature variations, install elastomeric sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.

C. Ventilation: Ventilate through-penetration firestop system installation area per through-penetration firestop system manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the specified requirements, provide systems products by one of the following:
   1.
   2. 3M Fire Protection Products, St. Paul, MN 55144
   3. Dap Inc., Dayton, Oh 45401
   4. Hilti Construction Chemicals, Inc., Tulsa, OK 74146
   5. Flamesafe - W.R. Grace & Co., Hatfield, PA 19440
   6. The RectorSeal Corporation, Houston, TX 77023
   7. Nelson Firestop Products, Tulsa, OK 74145
   8. United States Gypsum Co., Chicago. IL 60680
   9. Specified Technologies Co., Sommerville, Nj 08876
   10. Isolatek International, Stanhope, NJ 07874
   11. Instant Firestop Mfg.m, Inc., Niagara Falls, NY 14305
   12. NUCO Industries, Lake Forest, IL 60045
   13. Tremco; Cleveland, OH 44104

2.2 THROUGH-PENETRATION FIRESTOP SYSTEMS - GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that is needed to install fill materials and to comply with "System Performance Requirements" Article. Use only components specified by the through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Provide accessories which include but are not limited to the following items:

   1. Permanent forming/damming/backing materials including the following:
      a. Semirefractory fiber (slag/rock or mineral wool) insulation.
      b. Ceramic fiber.
      c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
      d. Fire-rated formboard.
      e. Joint fillers for joint sealants.
   2. Temporary forming materials.
   3. Substrate primers.
   4. Collars.
   5. Steel sleeves.

2.3 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference

to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

F. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1.
   2. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a non-slumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
   3. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
   4. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time,

and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of through-penetration firestop system. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Application or installation of material constitutes acceptance of the substrate.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing through-penetration firestop system to comply with recommendations of through-penetration firestop system manufacturer and the following requirements:

1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of through-penetration firestop system materials.
2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop system materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form release agents from concrete.

B. Priming: Prime substrates where recommended by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop system materials from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from through-penetration firestop system materials. Remove tape as soon as it is possible to do so without disturbing through-penetration firestop system's seal with substrates.

3.3 INSTALLING THROUGH-PENETRATION FIRESTOP SYSTEMS

A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop system manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional

shapes and depths required to achieve fire ratings of designated through-penetration firestop systems.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting agency employed and paid by the Owner will examine completed through-penetration firestop system to determine, in general, if it is being installed in compliance with requirements.
1. Inspecting agency is to report observations promptly and in writing to Contractor and Architect.

B. Do not enclose through-penetration firestop system with other construction until reports of examinations are issued.

C. Where deficiencies are found, repair or replace through-penetration firestop system so that it complies with requirements.

3.5 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

B. FS-1 Firestop Systems for No Penetrating Items: Comply with the following:

1. Available UL-Classified Systems: C-AJ- 0001-0999.

C. FS-2 Firestop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:

1. Available UL-Classified Systems: C-AJ- 1001-1999.

D. FS-3 Firestop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:

1. Available UL-Classified Systems: W-L-AJ- 1001-1999.

E. FS-4 Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing: Comply with the following:

1. Available UL-Classified Systems: C-AJ-2001-2999.

F. FS-5 Firestop Systems for Electrical Cables : Comply with the following:

1. Available UL-Classified Systems: C-AJ- 3001-3999.

G. FS-6 Firestop Systems for Cable Trays: Comply with the following:

1. Available]UL-Classified Systems: C-AJ-4001-4999.

H. FS-7 Firestop Systems for Insulated Pipes: Comply with the following:

1. Available UL-Classified Systems: C-AJ-5001-5999.

I. FS-8 Firestop Systems for Insulated Pipes: Comply with the following:

1. Available UL-Classified Systems: W-L-5001-5999.

J. FS-9 Firestop Systems for Miscellaneous Electrical Penetrants: Comply with the following:

1. Available UL-Classified Systems: C-AJ-6001-6999.

K. FS-10 Firestop Systems for Miscellaneous Electrical Penetrants: Comply with the following:

1. Available UL-Classified Systems: W-L-6001-6999.

L. FS-11 Firestop Systems for Miscellaneous Mechanical Penetrations: Comply with the following:

1. Available UL-Classified Systems: C-AJ- 7001-7999.

M. FS-12 Firestop Systems for Miscellaneous Mechanical Penetrations: Comply with the following:

1. Available UL-Classified Systems: W-L- 7001-7999.

N. FS-13 Firestop Systems for Groupings of Penetrations: Comply with the following:

1. Available UL-Classified Systems: C-AJ-8001-8999.

O. FS-14 Firestop Systems for Groupings of Penetrations: Comply with the following:

1. Available UL-Classified Systems: W-L-8001-8999.

END OF SECTION

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Joint sealants and installation accessories, including the following:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Latex joint sealants.
   4. Acoustical joint sealants.
   5. Installation accessories and materials for the above.

1.2 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

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. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2 inch wide joints formed between two 6 inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.3 QUALITY ASSURANCE

A. Comply with the applicable portions of ASTM C 1193 - Standard Guide for Use of Joint Sealants for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.4 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

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 40CFR59, 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. Stain Test Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

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

2.2 JOINT SEALANTS

A. S-1: Immersible Multicomponent, Pourable, Traffic Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T and I. Subject to compliance with requirements, provide one of the following:

1. Tremco Incorporated; Vulkem 45.
2. Sonneborn, Sonolastic SL2.
3. Sika Corporation, Sikaflex-2c, SL.

B. S-2: Single Component, Nonsag Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT. Subject to compliance with requirements, provide one of the following:

1. Pecora Corporation; Dynatrol I-XL.
2. Sika Corporation, Construction Products Division; Sikaflex - 1a.
3. Tremco Incorporated; Dymonic and Vulkem 116.
4. Sonneborn, Sonolastic NP1

C. S-3: Acrylic Latex or Siliconized Acrylic Latex Joint Sealant: ASTM C 834, Type OP, Grade NF. Subject to compliance with requirements, provide one of the following:

1. Pecora Corporation; AC-20+.
2. Tremco Incorporated; Tremflex 834.
3. Sonneborn, Sonolac.

D. S-4: Single Component, Nonsag Neutral Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT. Subject to compliance with requirements, provide one of the following:

1. Dow Corning Corporation; 790.
2. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
3. Tremco Incorporated; Spectrem 1.

E. S-5: Mildew Resistant, Single Component, Acid Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT. Subject to compliance with requirements, provide one of the following:

1. Dow Corning Corporation; 786 Mildew Resistant.
2. GE Advanced Materials - Silicones; Sanitary SCS1700.
3. Tremco Incorporated; Tremsil 200 Sanitary.

F. S-6: 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 E90. Subject to compliance with requirements, provide one of the following:

1. Pecora Corporation; AC-20 FTR or AIS-919.
2. USG Corporation; SHEETROCK Acoustical Sealant.
3. Tremco, Acoustical Sealant.

G. S-7: Acoustical Sealant for Fire Rated Partitions:

1. CP 25 by 3M Corporation, St. Paul, MN
   a. CP 25N/S for penetrations of vertical partitions and CP 25S/L for penetrations of horizontal partitions.
2. Acoustical Sealant by Specified Technologies, Somerville, NJ
3. FS 1900 Series Sealant Intumescent Elastomeric Firestop by International Protective Coatings, Oakhurst, NJ

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, type and material as recommended and approved in writing by joint sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

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

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: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Remove laitance and form release agents from concrete.
   3. 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.

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.

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 of 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 bond breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. 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.

F. Tooling of Nonsag 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 complying with ASTM C 1193, Figure 8A, unless otherwise indicated.
   4. Provide flush joint profile complying with ASTM C 1193, Figure 8B.
   5. Provide recessed joint configuration of recess depth and at locations complying with ASTM C 1193, Figure 8C.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound rated assemblies and elsewhere as indicated, 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.

3.4 CLEANING

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

3.5 PROTECTION

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

3.6 JOINT SEALANT SCHEDULE

A. S-1: Interior joints subject to traffic and running or standing water.

B. S-2: Interior moving joints, in non-traffic surfaces and surfaces not subject to running or standing water (control joints, etc.).

C. S-3: Non-moving interior joints in non-traffic surfaces and surfaces not subject to running or standing water, including the joint between dissimilar materials (around door frames, etc.).

D. S-2 and S-4: Perimeter joints between aluminum and other components with fluoropolymer resin based paint finish and adjacent construction. Test surface for adhesion of sealant prior to installation. Install primer when required by conditions and or field tests.

E. S-5: Toilet room joints at changes in materials, around joints between plumbing fixtures, walls and finish surfaces, countertop backsplash joint with wall, penetrations, openings, and other locations noted or shown on the Drawings.

F. S-6: Gypsum wall board construction and other locations shown or noted on the Drawings to seal joints and openings against the passage of sound and as required by partition material manufacturer to meet the manufacturer published acoustical sound ratings for assemblies shown on the Drawings.

G. S-7: Fire rated gypsum wall board construction and other locations shown or noted on the Drawings to seal joints and openings against the passage of sound and as required by partition material manufacturer to meet the manufacturer published acoustical sound ratings for assemblies shown on the Drawings.

END OF SECTION

SECTION 081113 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow steel door and window frames, including fabrication and installation accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance ratings or temperature-rise ratings, and finishes.

B. Shop Drawings:

1. Submit shop drawings for the fabrication and installation. Include details of each frame type, elevations of door design types, conditions at openings, details of anchorage to construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.
2. Provide a schedule of doors and frames using same reference numbers for details and openings as those on the Contract Document Drawings. Indicate all fire-rated doors and frames, welded and knockdown frames.

1.3 QUALITY ASSURANCE

A. Provide standard hollow steel doors and frames conforming to the applicable recommended practices contained in the following:

1. Standard: Steel Door Institute (SDI), Standard Steel Doors and Frames, SDI 100/ANSI A250.8, Recommended Specifications, current edition, except as herein modified.

B. Fire-Rated Assemblies:

1. Wherever a fire resistance classification is shown or scheduled for hollow steel work, provide fire-rated hollow steel frames investigated and tested as a fire rated door and/or window assembly, complete with type of fire door hardware to be used. Identify each fire rated frame with UL labels, indicating applicable fire-rating of both door and door frames and window frames.
2. Provide assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire protection ratings indicated, based on testing at positive pressure according to UL 10C.
3. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 450 deg F maximum in 30 minutes of fire exposure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Steelcraft; an Ingersoll-Rand company.
4. Republic Doors and Frames.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strips: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 1011 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 1008 and ASTM A 568.

C. Electrolytic Zinc Coated Steel Sheet: ASTM A 591, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher leveled standard of flatness where used for face sheets.

D. Structural Steel Shapes: ASTM A 36.

E. Steel Bars: ASTM A 108.

F. Steel Plate: ASTM A 283.

G. Supports and Anchors: Fabricate of not less than 0.053 inch thick sheet metal. Galvanized after fabrication for units to be built into exterior walls, complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.

H. Shop Primer: Modified alkyd rust inhibiting primer paint as standard with door and frame fabricator.

2.3 FABRICATION – GENERAL

A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp, buckle and shadows or surface deformations from welds. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously, grind, dress and make smooth, flush and invisible.

B. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware

supplier. Comply with applicable requirements of ANSI A115 Specifications for Door and Frame Preparation for Hardware, current edition.

C. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with National Builders' Hardware Association "Recommended Locations for Builder's Hardware", current edition.

2.4 FRAME FABRICATION

A. General:

1. Fabricate frames unless noted otherwise of full welded unit construction, with corners full mitered, reinforced, continuously welded full depth and width of frame including stops.
2. Knockdown frames will not be acceptable as alternates for welded frames.
3. Form frames of either cold or hot-rolled sheet steel.
4. Interior Frames: Provide not less than 0.053 inch thick steel for interior openings, including 4 feet wide.
5. For openings over 4 feet wide, increase thickness by at least 2 standard thickness.

B. Welded Frame Corner Joints (Full profile welded):

1. Fabricate frame members stamped in the flats to a predetermined pattern, designed to provide mitered faces or trims and mitered stops.
2. After fabricating head and jamb members, fit frames together engaging projecting tabs into corresponding slots in the head.
3. Tightly close contact edges so that trim and faces are aligned straight, level and true.
    a. Secure interlocking tabs where they pass thru head slots by welding.
    b. Weld all back bends together.
    c. Continuously weld mitered trim joint one each side inside the frame section. Dress and finish exposed joints to produce invisible connections.
    d. Weld head and jamb together along their intersecting depth and width inside the frame.
    e. Weld jambs to head overhang along the length of each rabbet, inside the frame completely welding the full joint perimeter.
    f. Grind all welds on exposed surfaces smooth and flush with adjoining surfaces.

C. Window Frames, Borrowed Lites, Mullions and Transom Bars:

1. Provide closed or tubular mullions and transom bars. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves same metal and thickness as frame.
2. Where installed in masonry, leave vertical mullions in frames open at the top so they can be filled with grout.
3. Provide steel channel stiffeners on interior of closed mullion sections.
4. Provide anchors for window and side lites frames same as for doors.
5. Provide concealed sleeves for frames to be shipped in one piece. Weld and grind smooth all field connections.

D. Welded Frame Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction and as required by fire-rated assemblies, formed of not less than 0.042 inch thick galvanized steel unless noted otherwise.

1. Masonry Construction: Adjustable, flat or corrugated or perforated, T-shaped to suit frame size with leg not less than 2 inches wide, by 10 inches long. Furnish at least three anchors per jamb up to 7 feet-6 inches height; four anchors up to 8 feet jamb height; one additional anchor for each 24 inches or fraction thereof over 8 feet height.
2. Metal Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frames. Provide at least four anchors for each jamb for frames up to 7 feet-6 inches in height; five anchors up to 8 feet jamb height; one additional anchor for each 24 inches or fraction thereof over 8 feet height.
3. In-Place Concrete or Masonry: Fabricate frames jambs to accept minimum 3/8 inch diameter concealed bolts into expansion shields or inserts at 6 inches from top and bottom and 26 inches o.c., unless otherwise shown. Reinforce frames at anchor locations. Provide non-removable snap-on covers over anchor bolts, unless otherwise indicated.

E. Floor Anchors: Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 0.067 inch thick galvanized steel sheet; clip type anchors, with two holes to receive fasteners, welded to bottom of jambs.

F. Finish Hardware Reinforcement: Unless otherwise indicated herein, reinforce frames for scheduled finish hardware, as follows:

1. Butt Hinges and Pivots: Steel plate not less than 0.187 inch thick x 1-1/2 inches wide x 6 inches longer than hinge, secured by not less than six spot welds.
2. Continuous Hinges: Steel plate not less than 0.187 inch thick x 1-1/2 inches wide x continuous, secured by spot welds 8 inches o.c.
3. Strike Plate Clips: Steel plate not less than 0.187 inch thick x 1-1/2 inches wide x 3 inch long.
4. Surface Applied Closers: Not less than 0.093 inch thick steel sheet, secured with not less than six spot welds.
5. Concealed Closers: Removable steel access plate, not less than 0.093 inch thick internal reinforcement of size and shape required, and enclosing housing to keep closer pocket free of mortar or other materials.

G. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.

H. Rubber Door Silencers: Drill stop to receive three silencers on single door frames and four silencers on double door frames. Install plastic lugs to keep holes clear during construction.

2.5 STOPS AND MOLDINGS

A. Provide stops and moldings around openings in hollow metal window units and for frames to receive lights where indicated.

B. Form fixed stops and moldings integral with frame. Provide fixed stops on outside of hollow metal units on corridor side of units, unless otherwise indicated.

C. Provide removal stops and molds at other locations, formed of not less than 0.032 inch thick steel sheets. Secure with countersunk machine screws spaced uniformly not more than 1/2 inch o.c. form corners with butted hairline joints.

D. Coordinate width of rabbet between fixed and removable stops with type of glass or panel and type of installation indicated.

2.6 SHOP PAINTING

A. Clean surfaces of fabricated units of mill scale, rust, oil, grease, dirt and other foreign matter.

B. After fabrication, dress, fill and sand tool marks and surface imperfections as required to make all faces and vertical edges smooth, level and free of all irregularities.

C. Pretreat cleaned surface in accordance with SSPC-PT-2, SSPC-PT3 or SSPC-PT4. Verify compatibility of primer with galvanized surfaces. Provide primer on galvanized surfaces that will not affect finish paint materials.

D. Shop Applied Paint: For steel surfaces, use rust inhibitive enamel or paint, either air drying or baking, suitable as a base for finish paints, complying with ANSI A224.1 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install hollow metal units and accessories in accordance with the final reviewed shop drawings, manufacturer's data, and as herein specified.

B. Setting Masonry Anchorage Devices:

1. Provide masonry anchorage devices where required for securing hollow metal frame to in-place concrete or masonry construction.
2. Set anchorage devices opposite each anchor location in accordance with details on final shop drawings, fire-rated assembly requirements and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed and free from dust and debris.

C. Floor Anchors: Floor anchors may be set with power actuated fasteners instead of masonry anchorage devices and machine screws, if so approved by the Architect.

D. Placing Frames:

1. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

2. In masonry construction, building in of anchors is included in the Section 04 20 00 - Unit Masonry.
3. Install fire-rated frames according to NFPA 80.
4. At in-place concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage device.
5. Remove spreader bars only after frames or bucks have been properly set and secured.
6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.2 ADJUST AND CLEAN

A. Final Adjustment: Check and readjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable at no additional cost to the Owner.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Interior flush wood doors, including factory fitting and machining for hardware and factory applied transparent finishing.

1.2 SUBMITTALS

A. Manufacturer's Literature:

1. Certificate of compliance with WDMA I.S1 and I.S.1-A.
2. Verification indicating that AWI Quality Certification Labels will be used for Project indicating that doors comply with requirements of grades specified.

B. Shop Drawings:

1. Show elevations, dimensions, construction details for each type of door.
2. Provide door schedule of doors using same reference numbers for openings as those on the Contract Drawings.

C. Samples:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.3 QUALITY ASSURANCE

A. Except as otherwise specified herein, provide wood doors conforming with Architectural Woodwork Institute (AWI) Architectural Woodwork Standards and/or Window and Door Manufacturers Association, (WDMA) I.S 1 and I.S 1-A, current editions.

B. Fire Rated Doors: Where shown as fire doors, provide doors conforming with UL 10(b) for label indicated on Drawings or specified herein, based on testing at positive pressure, according to UBC Standard 7-2 or UL 10C. Face veneer to conform with Section 3.11. Fabricate doors to permit installation in accordance with NFPA 80.

1. Oversized, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate stating that doors conform to all standard construction requirements of tested and labeled fire-door assemblies except for size.
2. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 250 deg F maximum in 30 minutes of fire exposure.

1.4 DELIVERY, HANDLING AND STORAGE

A. Individually package doors in corrugated cartons and/or poly bags by the manufacturer with identifying marks.

B. Store doors flat with spacers between each door, a minimum of 3 inches off the floor. Do not remove doors from cartons or poly bags until all painting and other interior finishing work has been completed. Immediately remove from the project site, damaged or otherwise unsuitable doors, when so ascertained.

1.5 FIELD CONDITIONS

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

1.6 WARRANTY

A. Provide door manufacturer's or fabricator's written warranty stating that the wood doors will be free of faults and defects in accordance with the General Conditions, except that the warranty is to be for the life of the installation for solid core doors, instead of one (1) year from the date of final acceptance by the Owner.

B. Provide warranty signed by the door manufacturer or fabricator. Warp in excess of that permitted by the WDMA or any defect which affects the operation or appearance of the door is considered a defect under the provisions of the warranty.

C. Provide warranty which includes the cost of defective door replacement and the cost of rehanging defective doors.

D. The door manufacturer or fabricator or his representative is responsible for inspecting the installation of the doors before issuance of the warranty and is to note on the warranty that the doors have been hung in accordance with the manufacturer's recommendations.

E. This warranty is in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Solid Core Doors:

1. Algoma Hardwoods, Inc., Algoma, WI 54201.
2. Eggers Hardwood Products Corporation, Two Rivers, WI 54241.
3. Graham Manufacturing Corporation, Mason City, IA 50401.
4. Marshfield Door Systems, Inc., Marshfield, WI 54449.
5. Mohawk Flush Doors, Inc., Northumberland, PA 17857.
6. VT Industries, Inc., Holstein, IA 51025.

2.2 DOOR CONSTRUCTION – GENERAL

A. Flush Solid Core Fire-Rated Doors: Flush, solid core, hardwood veneered, AWI Architectural Woodwork Standards, Premium Grade, Section 9, Symbol FD, 5-ply construction, Performance Duty Level; Extra Heavy (Heavy) Duty.

1. Core: Fire-rated mineral core construction, Type A: bonded core, 3/4 hour rated C, 1 hour rated B and 1-1/2 hour rated B, provide label doors where shown on the Drawings.
2. Face Veneers (1/40th inch thick before sanding):
   a. Wood species, veneer cut, as indicated on the Drawings. Book and balance match.
   b. Paint grade Natural Birch or Poplar, for paint finish, plain sliced.
   c. Medium Density Overlay, minimum 0.050 inch thick, for paint finish.
3. Cross Bands: 1/16 inch thick treated low density hardwood extending the full width and height of the door.
4. Adhesives: Type I.
5. Stiles: 1-3/8 inch thick composite material or treated multi-ply hardwood with a minimum of 750 lbs. screw withdrawal.
6. Edge Bands: Solid hardwood manufacturer's standard, match hardwood for transparent finish.
7. Inner Blocking (all doors):
   a. Top and Bottom: Continuous, minimum 5 inches wide solid wood blocking, or wider to assure no through bolting of surface hardware.
   b. Both Sides of Door: 5 inch wide x 10 inch long solid wood lock blocking.
8. Light Opening Moldings: Flush with door face or as shown on the Drawings, if not shown provide square shaped stops, hardwood veneered or veneer wrapped

same species as face veneer or match color of hardwood for transparent finish veneer.

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

9. Metal Edges and Astragals:
   a. Provide metal edges and astragals (except egress doors) on pairs of fire-rated doors factory machined for hardware cutouts.
   b. Positive Pressure Doors:
      1) Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
      2) Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.
10. Thickness: 1-3/4 inches.

B. Flush Solid Core 1/3 Hour Fire Rated Doors: Flush, solid core, hardwood veneered, AWI Architectural Woodwork Standards, Premium Grade, Section 9, Symbol FD 1/3, 5-ply construction, Performance Duty Level; Extra Heavy (Heavy) Duty.

1. Cores: Fire rated particleboard core construction, ANSI A208.1, Grade 1-LD-1, Type A: bonded core, 20 minute rated.
2. Face Veneers (1/40th inch thick before sanding):
   a. Wood species, veneer cut, matching as indicated on the Drawings.
   b. Paint grade Natural Birch or Poplar, for paint finish, plain sliced.
   c. Medium Density Overlay, minimum 0.050 inch thick, for paint finish.
3. Crossbands: Hardwood, 1/16 inch thick, extending the full width and height of the door.
4. Adhesives: Type I.
5. Stiles:
   a. Vertical: Minimum 1-3/8 inch thick
   b. Top and Bottom: Minimum 5 inches wide
6. Edge Bands: Solid hardwood manufacturer's standard, match hardwood for transparent finish.
7. Inner Blocking (all doors):
   a. Top and Bottom: Continuous, minimum 5 inches wide solid wood blocking solid, or wider to assure no through bolting of surface hardware.
   b. Both Sides of Door: 5 inch wide x 10 inch long solid wood lock blocking
8. Light Opening Moldings: Flush with door face or as shown on the Drawings, if not shown provide square shaped stops hardwood veneered or veneer wrapped, same species as face veneer or match color of hardwood for transparent finish veneer.
   a. Wood Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood veneered noncombustible beads matching

veneer species of door faces and approved for use in doors of fire protection rating indicated. Include concealed metal glazing clips where required for opening size and fire protection rating indicated.

9. Thickness: 1-3/4 inches.

C. Flush Solid Core Non-Fire Rated Doors: Flush, solid core, hardwood MDO veneered, AWI Quality Standards, Premium Grade, Section 1300, Symbol PC-5, 5-ply construction, Performance Duty Level; Extra Heavy (Heavy) Duty.

1. Cores: Particleboard core construction, ANSI A208.1, Grade 1-LD-2 1-LD-1, Type A: bonded core.
2. Face Veneers (1/40th inch thick before sanding):
   a. Wood species, veneer cut, matching as indicated on the Drawings.
   b. Paint grade Natural Birch or Poplar, for paint finish, plain sliced.
   c. Medium Density Overlay, minimum 0.050 inch thick, for paint finish.
3. Crossbands: Hardwood, 1/16 inch thick, extending the full width and height of the door.
4. Adhesives: Type I.
5. Stiles:
   a. Vertical: Minimum 1-3/8 inch thick.
   b. Top and Bottom: Minimum 4-1/2 inches wide.
6. Edge Bands: Same species as face veneer.
7. Inner Blocking (all doors):
   a. Top and Bottom: Continuous, minimum 5 inches wide solid wood blocking solid, or wider to assure no through bolting of surface hardware.
   b. Both Sides of Door: 5 inch wide x 10 inch long solid wood lock blocking.
8. Light Opening Moldings: Flush with door face or as shown on the Drawings, if not shown provide square shaped stops hardwood veneered or veneer wrapped, same species as face veneer or match color of hardwood for transparent finish veneer.
9. Thickness: 1-3/4 inches.

2.3 DOOR GRILLES AND LOUVERS

A. Provide and shop install louvers and grills of sizes and at locations shown on the Drawings. Provide fire-rated units in label doors.

1. Label Doors:
   a. Pemco, Model LV-FL
   b. Anomostat, Model FLDL-UL
   c. Active Air Inc., 1900A
2. Non-Label Doors:
   a. Pemco, Model LV-IY
   b. Anomostat, Model AFDL
   c. Active Air, Series 800

2.4 FABRICATION – GENERAL

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

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors and UL10c Positive Pressure Fire Door Test Method for hardware requirements.

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

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

D. Metal Astragals: Premachine astragals and formed steel edges for hardware for pairs of fire-rated doors.

E. Transom Panels:

1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
2. Fabricate door panels with full width, solid lumber rabbeted, meeting rails. Provide factory installed spring bolts for concealed attachment into jambs of metal door frames.

F. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

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

2.5 TRANSPARENT FINISHING

A. Completely factory finish all hardwood veneer doors specified under this Section and scheduled or noted on the Drawings to receive transparent finishing.

B. Preparation for finishing and finishing is to conform with AWI Section 5, Premium Grade, open (closed) grain. Provide the following finish:

1. Varnish, Conversion
2. Coordinate with Requirements in “Architectural Woodwork” and on the drawings.

C. Seal tops and bottoms of wood door with a heavy coat of varnish or equivalent sealer prior to delivery to the job. Seal vertical edges of doors to receive opaque finishes (paint).

2.6 OPAQUE FINISHING

A. Completely factory finish all hardwood veneer doors specified under this Section and scheduled or noted on the Drawings to receive opaque factory finish finishing.

B. Preparation for finishing and finishing is to conform with AWI Section 5, Premium Grade, open (closed) grain. Provide the following finish:

1. Varnish, Conversion
2. Coordinate with Requirements in “Architectural Woodwork” and on the drawings.

C. Seal tops and bottoms of wood door with a heavy coat of varnish or equivalent sealer prior to delivery to the job. Seal vertical edges of doors to receive opaque finishes (paint).

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify all measurements at the building. Provide other trades with information necessary for proper completion of related work.

B. Examine each area of installation and report in writing to the Architect any conditions which would adversely affect the doors and their installation. Corrective measures, if required will be performed by others. Starting of work constitutes acceptance of the existing conditions.

C. Inspect each area of installation and allow doors to acclimate to the area temperature and humidity.

3.2 INSTALLATION

A. Install flush wood doors in accordance with the manufacturer's printed instructions, referenced standards, the final reviewed shop drawings and this Section.

B. Carry doors upright. Do not drag doors. Protect door bottoms with scruff strips. Do not slide across one another. Condition doors to average humidity of spaces before hanging.

C. Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining including areas routed for concealed closers and all other hardware cutouts. Hand doors with hardware specified.

1. Provide uniform clearances at jambs and heads not to exceed 1/8 inch and at bottoms not less than 1/4 inch and not greater than 3/8 inch from floor finish or top of threshold, except where indicated otherwise on the Drawings to be under cut or where required to clear thresholds, floor finishes or for passage of air. Coordinate undercut requirements with various floor materials and trades installing such and provide undercuts to accommodate all conditions for installation of doors at no additional cost to the Owner.
2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.

D. Bevels:

1. Bevel non-rated doors 1/8 inch in 2 inches at lock and hinge edges.
2. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.

3.3 CLEANING AND PROTECTION

A. Repair or remove and replace defective doors as directed upon completion of installation. Remove and replace doors which can not be successfully repaired at no additional cost to the Owner.

B. Protection: Advise Contractor of procedures and precautions for protection of wood by the work or other trades until acceptance of the Work by the Owner. Advise Contractor of the required temperature and humidity conditions which must be maintained during the remainder of the construction period in areas of wood door installation.

C. Clean all door surfaces in accordance with the manufacturer's recommendations. Touch-up factory finished doors in accordance with the manufacturer's printed instructions. Remove and return to the factory for complete refinishing, any door which can not be successfully touched-up in the field.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Access doors and frames for walls and ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Intexforms, Inc.
2. Karp Associates, Inc.
3. Larsen's Manufacturing Company.
4. Milcor Inc.
5. Nystrom, Inc.

A. Flush panel metal, fire-rated access door:

1. Provide frames of 16 gage steel; panels of 20 gage steel, sandwich type.

2. Equip panels with an automatic closing mechanism on all doors.
3. Provide door and frame with factory prime coated with baked enamel over a protective phosphate coating on the steel.
4. Provide continuous steel hinges with stainless steel pin.
5. Provide cylinder type lock assembly, self-latching with key operated cylinder lock and having a mechanism to release the latch bolt from the inside.

B. Flush metal panel access door for gypsum wallboard or plaster construction:

1. Provide frame of 16 gage steel with galvanized steel wallboard bead surrounding frame and panel of 14 gage steel.
2. Provide door and frame factory prime coated with baked enamel over a protective phosphate coating on the steel.
3. Provide concealed, spring type hinges opening to 175 degrees.
4. Provide flush locks with metal cam and be a key operated cylinder lock or slotted for screwdriver operation.

C. Flush glass fiber reinforced gypsum access panel for gypsum wallboard or plaster ceiling construction.
1. Drop-in or hinged access panels.
2. Fabricated with high density gypsum reinforced with continuous strand filament glassfiber mat.
3. Provide door panel and frame ready for primer on site.
4. For hinged panels, provide concealed hinges and cam lock, key operated or slotted.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.

2.4 FINISHES

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

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

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

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

C. Prepare fiber glass reinforced gypsum panels for final finish according to manufacturer’s instructions.
1. Lightly sand and fill exposed surfaces for smooth finishes.
2. Provide skim coat of joint compound on exposed surfaces for final finishes of semi-gloss or gloss paint and if in Level 5 gypsum wallboard construction.
3. Painting contractor to comply with ASTM C840.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084226 - ALL-GLASS ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior swinging all-glass entrance doors and sidelights.
   2. Continuous top and bottom rail entrance doors.
   3. Continuous recessed top and bottom glazing channels.
   4. Finish and installation hardware and accessories for complete fabrication.

1.2 PERFORMANCE REQUIREMENTS

A. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths required to meet or exceed the following criteria:

   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Impact Loads For Interior Installations: Per applicable codes.

1.3 SUBMITTALS

A. Product Data: For each type of product.

   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for all-glass system.

B. Shop Drawings: For all-glass entrances.

   1. Include plans, elevations, and sections.
   2. Show glass thickness and glazing details, indicate type and color of glass.
   3. Show dimensions, installation and erection details including connections, fasteners and welds (if any).
   4. Include details of fittings and glazing, including isometric drawings of patch fittings.
   5. Door hardware locations, mounting heights, and installation requirements.

C. Samples for Verification: For each type of exposed finish indicated, prepared on Samples of size indicated below.

1. Metal Finishes: 6-inch- (150-mm-) long sections of fittings, accessory fittings, and other items.
2. Glass: 6 inches (150 mm) square, showing exposed-edge finish.

D. Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, sidelights and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.4 QUALITY ASSURANCE

A. Manufacturer/Fabricator's Responsibilities:

1. Provide all glass storefront, entrances and associated items by a firm having undivided responsibility for the entire storefront, entrance and glazing fabrication and installation, except as otherwise specified herein.
2. The Storefront and Entrance Manufacturer/Fabricator's Representatives is required to inspect the storefront and entrance door installation to ensure conformance with this Section and to ensure warrantability of the storefront, doors, hardware, finish and the installation.

B. Installer Qualifications: Engage an experienced installer as evidenced by not less than five (5) years consecutive experience and who has specialized in installing all glass storefront and entrances similar to those required for this Project and with a record of successful in-service performance.

C. Provide all glass storefront, entrance doors and associated items of the installation in strict accordance with state and local building codes and ordinances, and conforming with applicable impact and wind load factors relative to fittings, glass and glazing.

D. Comply with the following:

1. Safety Glazing
   a. FS DD-G-1403B
   b. ANSI Z97.1
   c. ANSI Z97.1a
   d. U.S. Consumer Product Safety Commission Standard 16 CFR 1201 CI and CII
2. Glazing Material:
   a. FS DD-G-451D
   b. ANSI Z97.1

E. Installer Qualifications: Engage an experienced installer as evidenced by not less than five (5) years consecutive experience and who has specialized in installing all-glass entrances and storefront similar to those required for this Project and with a record of successful in-service performance.

F. Source Limitations: Obtain each type of all-glass storefront and entrance through one source from a single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver all-glass storefront and entrance door components to the project site clearly marked for proper identification. Do not deliver to the project site until all adjacent construction is complete and support framing is in place.

1.6 PROJECT/SITE CONDITIONS

A. Field Measurements: Verify openings, dimensions and conditions of the installation at the project site prior to preparation of shop drawings and fabrication to ensure proper fitting of components. Show and note field verified dimensions and conditions on shop drawings. Coordinate locations and requirements for in place and subsequent construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. C.R. Laurence Co, Inc.
2. DHD International.
3. Doralco Architectural Metals.
4. Dorma Glass
5. Inkan Limited

2.2 COMPONENTS

A. Fitting Configuration:

1. Manual-Swinging, All-Glass Entrance Doors and Sidelights: Patch fittings at head and sill on pivot side, and for lock at sill of swing side as shown on the drawings.
2. Manual-Sliding, All-Glass Entrance Doors and Sidelights: Continuous rail fitting at top and bottom.

B. Rail Fittings:
1. Material: Stainless-steel-clad aluminum or as indicated on the drawings..
2. Height: 3-1/2 inches (89 mm) or as indicated on the Drawings.
3. Profile: Tapered

4. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

C. Accessory Fittings: Match fitting metal and finish for the following:

1. Overhead doorstop.
2. Center-housing lock.

D. Stainless-Steel Cladding: ASTM A 666, Type 304, 16 gage.

1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range.
3. Remove or blend tool and die marks and stretch lines into finish.
4. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
5. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
6. Finish: No. 4 directional satin finish; No. 6 matte directional polish; No. 8 mirrorlike reflective, nondirectional polish.

E. Anchors and Fastenings: Concealed.

F. Weather Stripping: Pile type; replaceable without removing all-glass entrance doors from pivots.

G. Recessed Extruded Aluminum Glazing Channels: Aluminum extrusions complying with ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5, with manufacturer's standard continuous elastomeric gaskets retained in extrusion races.

H. Setting Blocks: Neoprene blocks, 70 to 90 type A durometer hardness.

I. Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials.

1. Class 1: Clear monolithic.

   a. Thickness: 1/2 inch (13 mm).

2. Exposed Edges: Machine ground and flat polished.
3. Butt Edges: Flat ground.
4. Corner Edges: Lap-joint corners with exposed edges polished.

2.3 HARDWARE

A. General: Heavy-duty entrance door hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrance systems indicated. For exposed parts, match metal and finish of fittings.

B. Concealed Floor Closers and Top Pivots: Center hung; BHMA A156.4, Grade 1; including cases, bottom arms, top walking beam pivots, plates, and accessories required for complete installation.

1. Swing: Single acting.

    a. Positive Dead Stop: Coordinated with hold-open angle if any, or at angle selected.

2. Hold Open: Selective.
3. Positive Dead Stop: Coordinated with hold-open angle, if any, or at angle selected by Architect from manufacturer's standard options.
4. Opening-Force Requirements:
    a. Accessible Interior Swinging Doors: Not more than 5 lbf (22.2 N) to fully open door.

C. Concealed Overhead Holder: BHMA A156.8, Grade 1, with dead-stop setting coordinated with concealed floor closer.

D. Push-Pull Set: As indicated.

E. Exit Devices: UL 305.

1. Function: Operation by push-pull when inside operator is locked down (dogged); outside operation by key or electronic hardware (cardkey).
2. Latching: At door head.
3. Style: As indicated on the drawings.
4. Provide exit devices on both leaves of pairs of doors.

2.4 FABRICATION

A. Fabricate all-glass entrance doors and storefront to arrangements shown on the Drawings.

B. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering. Bevel and polish exposed edges of glass panels.

1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

C. Factory assemble components and factory install hardware and fittings to greatest extent possible.

D. Fabricate storefront and door components with fully resilient settings for glass panels by use of elastomeric gaskets on both sides of the glass. Factory glaze doors. Glass panels are to be replaceable without dismantling the entrance system.

E. Provide screws, miscellaneous fastening devices and internal components of stainless steel, or plated or corrosion- resistant materials of sufficient strength to perform the functions for which they are used. Fabricate storefront and door and members for assembly and installation using concealed fasteners. Exposed screws or fasteners are not allowed in the fabrication and installation of the storefront and entrances.

F. Wrap fabricated members and glass panels at the factory with protective covers which will remain in place until completion of the installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install all-glass systems and associated components according to manufacturer's written instructions.

B. Verify that support framing and solid substrate are installed prior to installation of fittings, glass and hardware.

C. Set units level, plumb, and true to line, with uniform joints.

D. Maintain uniform clearances between adjacent components.

E. Install all-glass entrance and storefront components in accordance with the following tolerances:

1. Deviation from plumb, level or dimensioned angle is not to exceed 0.125 inch per 12 feet of length of any member, 0.25 inch in any total run in any line.
2. Deviation from theoretical position in plan or elevation, including deviation from plumb, level or dimensioned angle, is not to exceed 0.375 inch total at any

location. Change in deviation is not to exceed 0.125 inch for any 12 foot run in any direction.

3. Maximum offset from true alignment between two consecutive members placed end to end is not to exceed 0.062 inch.

F. Recessed Channel Installation:

1. Install recessed glazing channels and glass in accordance with the manufacturer's printed installation instructions and the final reviewed shop drawings
2. Verify block-out or recess in floor slab or other construction is provided for bottom glazing channel prior to installation of channel and glass.
3. Verify that support framing and solid substrate for top recessed glazing channel are installed prior to installation of glazing channels and glass.
4. Install glass units in recessed glazing channels using glazing channel manufacturer's standard extruded glazing gaskets and strips installed in accordance with the manufacturer's printed installation instructions.

G. Lubricate hardware and other moving parts according to manufacturer's written instructions.

H. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

3.3 ADJUSTING AND CLEANING

A. Adjust all-glass entrance doors and hardware to produce smooth operation and tight fit at contact points and weather stripping.

1. For all-glass entrance doors accessible to people with disabilities, adjust closers to provide a three-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch measured to the leading door edge.

B. Remove excess sealant and glazing compounds and dirt from surfaces.

C. After erection, cover and protect exposed portions of the entrances and storefront from damage.

D. Just prior to final acceptance, remove protective coverings and clean surfaces with plain water, or if required with a solution of water and mild household detergent as recommended by the manufacturer.

E. Remove and replace any component that cannot be successfully repaired at no additional cost to the Owner.

END OF SECTION 084226

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Mechanical door hardware for swinging doors, sliding and folding doors.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

a. Details of interface of electrified door hardware and building safety and security systems.
b. Schematic diagram of systems that interface with electrified door hardware.
c. Elevations doors controlled by electrified door hardware.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Door Hardware Schedule:
1. Provide hardware schedule containing a complete listing of all finish hardware items required for the project, whether or not specifically named in the Specifications or indicated on the Drawings. The Architect's review of the schedule is not to be construed to relieve the Contractor of responsibility for errors or omissions in the schedule, nor of the responsibility to completely equip the project with finish hardware.
2. Include in the schedule each door location, hand of door, complete list of each hardware set item per set, finish, manufacturer of each item and keying information. Use same reference numbers and letters for doors and sets as those on the Contract Documents.

D. Keying Schedule:
1. Submit keying schedule for review by Owner.

E. Warranty: Copy of warranties for each item requiring warranty.

F. Operation and Maintenance Manuals: Upon completion, furnish two (2) complete maintenance manuals to the Owner. Include the following items:

1. Approved hardware schedule, catalog cuts and keying schedule.
2. Hardware installation and adjustment instructions.
3. Manufacturer's written warranty information.
4. Wiring diagrams and operational descriptions for all electronic openings.

1.3 QUALITY ASSURANCE

A. Supplier Qualifications:

1. The hardware supplier is to be an industry recognized company who has maintained and has been furnishing hardware in the project's vicinity for a period of not less than two (2) years.
2. The supplier of the finish hardware is to be a firm with not less than five (5) years of consecutive experience in supplying finish hardware of the quantity and quantity specified for projects similar in size and complexity.
3. The supplier of the finish hardware is to be a firm technically qualified and experienced in supplying building structures with finish hardware.
4. The supplier is to employ a experienced certified Architectural Hardware Consultant (AHC) who is to be available, at reasonable times during the course of the hardware submittals, supply and installation, for consultation about the project hardware requirements to the Owner, Architect and Contractor.
5. Refinements such as butt knuckle, clearance, strike lip lengths and adjustments, beveling of lock faces, handing of doors and centering of backsets will be expected and is to be indicated in the submitted hardware schedule.

B. Supplier Responsibilities: The supplier is responsible for thoroughly detailing the entire project to assure that the items specified will properly function in the indicated locations. Should the items specified not work properly, it is the responsibility of the supplier to furnish suitable items of comparable quality as approved by the Architect to those being furnished throughout the project at no additional cost to the Owner.

C. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

1. In case of conflict between type of hardware specified and type required for fire protection, furnish type required by NFPA and UL at no additional cost to the Owner.

E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
1. In case of conflict between type of hardware specified and type required for fire protection, furnish type required by NFPA and UL at no additional cost to the Owner.

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

G. Means of Egress Doors:
1. Comply with NFPA 101.
2. Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
3. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
4. Thresholds: Not more than 1/2 inch high.

H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, ICC/ANSI A117.1 and applicable local codes.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

I. Reference Standards: ANSI/BHMA A156

1.4 DELIVERY, STORAGE, AND HANDLING

A. Handle finish hardware in such a manner as to prevent damage. Store in a clean, dry, secure place.

B. Package each set of hardware items together in sets, identified with set numbers in accordance with the final reviewed hardware schedule.

1. Package each item of hardware separately and labeled separately.
2. Include in each package appropriate fastening installation instructions and templates.
3. Deliver a complete schedule with shipped hardware.

C. Should marking of any item become separated from the item, return the item to the supplier for marking.

D. Immediately remove from the job site all damaged or otherwise unsuitable items when so ascertained and replace with an identical item at no additional cost to the Owner.

1.5 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

F. Keying Meeting: Conduct meeting with the Owner or Owner's representative prior to submitting the Key schedule for Owner's review. Incorporate keying meeting decisions into final keying schedule including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Final key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

1.6 WARRANTY

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

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
b. Mortise Locksets: Five years from date of Substantial Completion.
c. Exit Devices: Two years from date of Substantial Completion.
d. Manual Closers: 10 years from date of Substantial Completion.
e. Concealed Floor Closers: Five years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled on Drawing A00-50 to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products and products complying with BHMA designations referenced.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

2.2 MATERIALS & FINISHES

A. Materials and equipment are contained in the Hardware Schedule.

B. Unless otherwise specified, provide various items of hardware with color and finish matching the finish specified for locksets and latchsets.

C. Provide finishes of the same designation, that come from two or more sources, which match when the items are viewed at arms length and approximately 2 feet apart.

D. Provide hue of color of each finish matching whether or not the base metal is cast, forged or stamped, or when plating is applied over steel, brass or bronze.

E. Provide manufacturer's standard painted finish over bonderized and prime coated metal surfaces where required; the lacquer or enamel matching the finish of the locksets and latchsets unless otherwise specified.

F. Hardware Finishes:

1. Provide finishes as indicated in the herein hardware sets. Provide all other hardware with matching finish unless noted otherwise.
2. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
3. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

2.3 TEMPLATES

A. Fabricate locks, hinges, closers and other hardware, to be mounted on hollow metal doors and frames to templates; furnish with machine screws. Furnish templates to hollow metal door and frame manufacturers and other manufacturers requiring such templates.

2.4 FASTENINGS

A. Furnish hardware with screws and other fastenings suitable to assure permanent anchorage. Where exposed, provide fastenings of countersunk oval head type, (except use flat head for hinges), and matching finish of hardware being attached. Provide concealed fastenings. Exposed through and sex bolts are not acceptable. Do not attach hardware with self-tapping or sheet metal screws. Fasten floor type stops and holders to the floor with machine screws into expansion shields.

2.5 ACCEPTABLE MANUFACTURERS

A. Proprietary names used to designate hardware in the schedule are not intended to imply that products of the manufacturer are required to the exclusion of equivalent products of other herein named or listed manufacturers.

2.6 ELECTRONIC HARDWARE

A. For each item of electrified hardware specified, provide standard “Molex” type plug connectors to accommodate up to twelve (12) wires. Provide Plug connectors that plug directly into through-door wiring harnesses, frame wiring harnesses, electric locking devices and power supplies.

2.7 HINGES AND PIVOTS

A. Butt Hinges:
   1. Complying with ANSI/BHMA A156.1 Grade 1.
   2. Provide one (1) hinge for every 30 inches of door height.
   3. Provide non-removable pins on all lockable reverse bevel doors.
   4. Provide butt hinges as manufactured by one of the following:
      a. McKinney (MC)
      b. Stanley (ST)
      c. Hager (HA)

B. Pivots:
   1. Complying with ANSI/BHMA 156.4 Grade 1.
   2. Provide pivots as manufactured by one of the following:
      a. Rixson (RX)
      b. Dorma (DO)

2.8 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
   1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
   2. Deadbolts: Minimum 1-inch (25-mm)bolt throw.

C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

D. Lock Trim: As indicated on Drawings.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
   4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Mortise Locks: BHMA A156.13; Grade **1**; stamped steel case with steel or brass parts; Series 1000.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Corbin Russwin Architectural Hardware; ML2000 Series.

G. Roller Latches: BHMA A156.16; Grade 1; rolling plunger that engages socket or catch, with adjustable roller projection.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ives Hardware;
      b. Rockwood Manufacturing Company.
      c. Stanley Commercial Hardware; Div.

2.9 ELECTROMAGNETIC LOCKS

A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.

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

      a. Door Controls International, Inc.

b. DynaLock Corp.
c. Schlage Commercial Lock Division.
d. Securitron Magnalock Corporation.
e. Security Door Controls.

B. Delayed-Egress Electromagnetic Locks: BHMA A156.24, electrically powered, with electromagnet attached to frame and armature plate attached to door; depressing push bar for more than 3 seconds initiates irreversible alarm and 15-second delay for egress. When integrated with fire alarm, fire alarm voids 15-second delay.

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

a. Door Controls International, Inc.
b. DynaLock Corp.
c. Schlage Commercial Lock Division.
d. Securitron Magnalock Corporation.
e. Security Door Controls.

2.10 MANUAL AND AUTOMATIC FLUSH BOLTS

A. Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. IVES Hardware.
b. McKinney
c. Rockwood
d. Trimco.

2.11 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3, Grade 1 Certified.
1. Provide exit devices listed by Underwriters Laboratories and bearing the UL label for life safety in full compliance with NFPA 80 and NFPA 101.
2. Provide lever trim available in finishes and designs to match that of the specified locksets.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Corbin Russwin Architectural Hardware.
b. SARGENT Manufacturing Company.
c. Von Duprin.
d. Yale Security Inc.

2.12 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturer: Same manufacturer as for locking devices.

2. Provide cylinders complying with BHMA A156.5, Grade 1, finished face to match lockset.

3. Coordinate cylinder requirements with Owner and Landlord, if applicable.

B. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.13 KEYING

A. Complying with BHMA A156.28.

B. Provide locks and cylinders construction master-keyed or temporary cylinders in quantities as directed by General Contractor. Provide all locks and cylinders to be master-keyed or grandmaster-keyed into new key system as directed by the Owner. Provide factory keyed all locks and cylinders. Furnish the following key amounts:
1. Two (3) change keys per lock
2. Three (3) grand master keys
3. Six (6) master keys per master level
4. Fifteen (15) construction/temporary keys
5. Send master keys and key blanks directly from the factory to the Owner in sealed boxes. Submit signed receipt indicating such quantities received and person receiving.

C. Key Cabinet:
1. Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Provide key control cabinet with expansion capacity of 150 percent of the number of locks required for the project.
2. Provide key cabinet as manufactured by one of the following:
   a. Telkee
   b. MMF
   c. Lund

2.14 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

B. Astragals: BHMA A156.22.

2.15 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4, Grade 1 Certified; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Corbin Russwin Architectural Hardware; DC6000 Series.
    b. LCN Closers; 4041 Series.
    c. Norton Door Controls; 7500 Series.
    d. Sargent Manufacturing Company; 350 Series.

2.16 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. LCN Closers; Overhead In-Door Closer, 3130 Series
    b. LCN Closers; Overhead In-Frame (Aluminum), 2030 Series
    c. Norton Door Controls.
    d. Rixson Specialty Door Controls.
    e. Sargent Manufacturing Company.

2.17 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16, Grade 1..

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Ives Hardware.
   b. McKinney.
   c. Rockwood Manufacturing Company.
   d. Trimco.

2.18 OPERATING TRIM (PUSH/PULL UNITS)

A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Forms + Surfaces.
   b. Hager Companies.
   c. IVES Hardware; an Ingersoll-Rand company.
   d. Rockwood Manufacturing Company.
   e. Trimco.

2.19 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8, Grade 1.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Glynn-Johnson.
   b. Rixson.
   c. Rockwood Manufacturing Company.
   d. Sargent Manufacturing Company.

2.20 GASKETING, THRESHOLDS AND SILENCERS:

A. General: BHMA A156.22 (Weather-Stripping) and BHMA A156.21 (Thresholds); Thresholds complying with the American Disabilities Act)ADA) and ANSI A117.1.
   1. Silencers: Furnish rubber door silencers at all hollow metal and/or wood frames; two (2) per pair and three (3) per single door frame.
   2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Pemko
      b. Reese
      c. McKinney

d. Zero

2.21 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. IVES Hardware.
   b. McKinney
   c. Rockwood Manufacturing Company.
   d. Trimco.

2.22 FABRICATION

A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

   a. Wood or Machine Screws: For the following:

      1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
      2) Strike plates to frames.
      3) Closers to doors and frames.

   b. Steel Through Bolts: For the following unless door blocking is provided:

1) Surface hinges to doors.
2) Closers to doors and frames.
3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.23 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings. If not indicated, comply with the following unless otherwise required to comply with governing regulations. Where standards or specified heights conflict, consult the Architect for interpretation prior to mounting hardware.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
3. Install finish hardware using supplied templates for each item. Cut and fit substrate to avoid substrate damage and weakening. Cover cut-outs with hardware item. Mortise work in correct locations and size, without gouging, splintering or causing irregularities in the finished work.
4. Where cutting and fitting is required on substrates to be painted or stained, install, fit and adjust hardware prior to finishing work. Remove finish hardware and place in original packaging. Reinstall hardware after finishing.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying schedule or directed by Owner.

E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

H. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

I. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. The Architect and hardware supplier will do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Glass for interior borrowed lites, storefront framing.
   2. Coated (back painted) glass.
   3. Laminated glass.
   4. Glass with decorative overlay film.
   5. Glass with finished edges.
   6. Glazing sealants and accessories.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Impact Loads For Interior Installations: Per applicable code or herein referenced industry standard.

1.4 COORDINATION

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

1.5 SUBMITTALS

A. Product Data: For each type of product, including glazing materials and mirror adhesive.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

1. Tinted glass.
2. Coated glass.
3. Laminated glass.
4. Decorative.

C. Glazing Accessory Samples: For sealants and glazing gaskets, 6 inches long.

1.6 QUALITY ASSURANCE

A. Comply with the following:

1. GANA Publications: GANA's - Glazing Manual.
2. Glazing Material: FS DD-G-451D, ANSI Z97.1, and ASTM C 1036.
3. Safety Glazing: ASTM C 1048, ASTM C 1172, ANSI Z97.1, ANSI Z97.1a, U.S. Consumer Product Safety Commission Standard 16 CFR 1201 CI and CII, and GANA'S - Glazing Manual and Laminated Glass Design Guide.
4. Structural Sealant Glazing: Comply with ASTM C 1401 for design and installation.

B. Unless otherwise shown or governed by other referenced standards specified, conform with details and procedures of GANA, (Glass Association of North America) Glazing Manual, current edition.

C. Source Limitations:

1. Laminated Glass: Obtain laminated glass units from one manufacturer using the same type of glass lites and interlayers for each type of unit indicated.
2. Tempered Glass: Obtain tempered glass units from one manufacturer using the same type of glass and tempering process for all units.

D. In the event of a conflict between specified standards or references the more stringent or greater is to take precedent and be the one utilized for the design and installation.

1.7 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Clear Float Glass: Complying with ASTM C 1036, Type I, Class 1, Quality q3, thickness as shown or specified, tempered in doors and adjacent lights where shown on Drawings or required by codes, one of the following:

1. AGC, clear float glass.
2. Guardian, clear glass.
3. PPG Industries, clear glass.
4. Viracon, clear glass.

B. Fully Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

C. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

D. Decorative Film Overlay: Translucent, dimensionally stable, cast PVC film, 2-mil- (0.05-mm-) minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.

E. Recessed Extruded Aluminum Glazing Channels: Aluminum extrusions complying with ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5, with clear anodized finish with manufacturer’s standard continuous roll-in glazing gaskets retained in extrusion races, as manufactured by C.R. Laurence Company or other as approved by Architect.

F. Hardware for Decorative Glass Installation: Glass panel to wall clamps/connectors; glass to glass panel clamp/connectors; panel support bars; stand-off display system with caps; as indicated on drawings.

G. Glazing Tape: Polyisobutylene/Butyl, complying with ASTM C 1281:

1. Dap, Inc., Butyl Rubber Tape.
2. Pecora Corporation, G-66 or BB-50.
3. Tremco, Tremco 400 Tape.

H. Setting Blocks: Neoprene blocks, 70 to 90 Type A durometer hardness.

I. Spacers: Neoprene blocks, 40 to 50 Type A durometer hardness, 3 inches long, self-adhesive on one face only.

2.2 HEAT TREATED TEMPERED GLASS

A. Provide tempered glass horizontally heat treated in accordance with FS DD-G-1430B. Fabricate tempered and heat strengthened glass units so that roll distortion lines are parallel to the bottom edge of the glass units and the bottom or sill of the glazing pocket into which the glass unit is being installed.

B. Provide heat treated glass complying with ASTM C 1048 for the following:

1. Kind FT: Fully tempered.

2.3 GLAZING SEALANTS

A. Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select 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. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Single-Component Neutral and Basic-Curing Silicone Glazing Sealants:
   a. Products:
      1) Dow Corning Corporation; 790.
      2) GE Silicones; SilPruf LM SCS2700.
      3) GE Silicones; SilPruf SCS2000.
      4) Sonneborn, Div. of ChemRex, Inc.; Omniseal.
   b. Type and Grade: S (single component) and NS (nonsag).
   c. Class: 100/50.
   d. Use Related to Exposure: NT (nontraffic).

e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
   1) Use O Glazing Substrates: Coated glass.

2. Neutral-Curing Silicone Glazing Sealants:
   a. Products:
      1) Dow Corning Corporation; 791.
      2) Dow Corning Corporation; 795.
      3) GE Silicones; SilPruf NB SCS9000.
      4) GE Silicones; UltraPruf II SCS2900.
   b. Type and Grade: S (single component) and NS (nonsag).
   c. Class: 50.
   d. Use Related to Exposure: NT (nontraffic).
   e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
      1) Use O Glazing Substrates: Coated glass.
3. Class 25 Neutral-Curing Silicone Glazing Sealant:
   a. Products:
      1) Dow Corning Corporation; 799.
      2) GE Silicones; UltraGlaze SSG4000.
      3) GE Silicones; UltraGlaze SSG4000AC.
      4) Polymeric Systems Inc.; PSI-631.
      5) Schnee-Morehead, Inc.; SM5731 Poly-Glaze Plus.
   b. Type and Grade: S (single component) and NS (nonsag).
   c. Class: 25.
   d. Use Related to Exposure: NT (nontraffic).
   e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
      1) Use O Glazing Substrates: Coated glass.

2.4 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.

D. Decorative Film Overlay: Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges, in pattern indicated on Drawings or with graphic image as indicated on Drawings to the back face of clean glass, according to manufacturer's written instructions, including surface preparation and application temperature limitations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Minimum required face and edge clearances.
3. Effective sealing between joints of glass-framing members.
4. Verify all dimensions of in-place and subsequent construction.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 INSTALLATION - GENERAL

A. Employ only experienced glazers who have had previous experience with the materials and systems being applied. Use tools and equipment recommended by the glass manufacturer.

B. Measure all openings and cut glass accurately to fit each opening with minimum edge clearances and bite on glass as specified by GANA. If glass is to be cut to size at project site deliver each piece to project at least 2 inches larger (in both dimensions) than required, so as to facilitate the cutting of clean cut edges without necessity of seaming or nipping. Do not seam, nip or abrade tempered glass at the job site.

C. Clean glazing stops and rabbets to receive glazing materials of all obstructions and deleterious substances which might impair the work. Remove protective coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing sealants or tapes.

D. Prime surfaces to receive glazing sealants in accordance with manufacturer's recommendations, using recommended primers. Test materials and surfaces for adhesion of sealants.

E. Inspect each piece of glass immediately before installation. Do not install pieces which have significant impact damage at edges, scratches or abrasion of faces or any other evidence or damage.

F. Locate setting blocks at the quarter points of sill but no closer than 6 inches to corners of glass. Use blocks of proper size to support the glass in accordance with manufacturer's recommendations.

G. Provide spacers for all glass to separate glass from stops, except where continuous gaskets or tape are required. Locate spacers 36 inches o.c. maximum inside and out, with a minimum of two (2) spacers per edge of glass. Provide thickness equal to sealant or compound thickness shown. Provide width as required for minimum of 3/8 inch bite on glass at all four (4) edges.

H. Set glass in a manner which produces greatest possible degree of uniformity in appearance. Face all glass, which has dissimilar faces, with matching faces in the same direction. Set all glass with bow (if any) to exterior.

I. Install tempered glass units with the roll distortion parallel to the bottom or sill glazing pocket in accordance with the glass manufacturer's recommendations for the type of glass installation.

J. Do not use glazing materials from different sources in the same joint system unless the manufacturer of each material has stated in writing that his material is fully compatible with the other material.

K. Patch Fitting Installation:

1. Verify that support framing and solid substrate are installed prior to installation of fittings and glass.
2. Install patch fittings and glass in accordance with the manufacturer’s printed installation instructions and the final reviewed shop drawings.

L. Use masking tape or other suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.

M. Glazing Tape:

1. Butt or lap ends of sealant tape in accordance with the manufacturer's recommendations.
2. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

3. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
4. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
5. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
6. Do not remove release paper from tape until just before each glazing unit is installed.

N. Clean excess sealant from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.

3.4 GASKET GLAZING (DRY)

A. Install glass units in interior glazing channels using channel manufacturer's standard extruded glazing gaskets and strips installed in accordance with manufacturer's printed installation instructions.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 SILICONE GLAZING

A. Clean, prime and mask at structural silicone joints during the same work day on which the silicone is applied.

B. Temporarily clamp glass during cure of structural silicone. After sufficient cure, remove clamps and fill any gaps in silicone.

C. Mask glass and aluminum during application of structural silicone. Remove masking immediately after tooling sealant.

D. Seal exterior flush joints at structural silicone conditions with silicone sealant specified herein.

E. Do not apply structural silicone to edges of insulating glass units, or to edges of laminated glass units. Do not adhere to, or place against, the edge of a laminated glass unit interlayer, sealants used as weather seals.

3.6 PROTECTION AND CLEANING

A. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of glass. Do not apply warning markings directly to the glass.

B. Remove and replace glass which is broken, cracked, chipped or damaged in any way and from any source, including weather, vandalism and accidents during the construction period at no additional cost to the Owner.

C. Maintain glass in a reasonably clean condition during construction so that it will not become stained and will not contribute to the deterioration of glazing materials.

D. Wash and polish glass on both faces just prior to final acceptance. Comply with instructions and recommendations of glass manufacturer and glazing materials manufacturer for cleaning in each case.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes non-structural metal framing, including steel studs, furring, ceiling and soffit suspension systems, backing plates for support of items attached to metal framing system and supplementary parts and components, required for a complete installation.

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

B. Performance Requirements - Partitions: When spacing, framing sizes, metal gages and span tables are not indicated on the Drawings, engineer assemblies to withstand the loads prescribed by the authorities having jurisdiction, within the specified deflection limits.
1. Lateral loading: 5 psf for interior partitions; as prescribed for exterior walls.
2. Limit metal framing systems deflection under load to the following:
    a. L/240 where supporting gypsum board only.
    b. L/360 where supporting tile.

1.2 SUBMITTALS

A. Product Data: Submit a list of proposed products and materials to be provided for complete assemblies, along with manufacturer's product data, specifications, typical installation details and other data for each material listed to prove compliance with the specified requirements.

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, and approved by the authorities having jurisdiction.

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 MANUFACTURERS

A. Provide metal framing members from one of the following:

1. Marino Industries, Inc.
2. Scafco Steel Stud Manufacturing Co.
3. Clark Dietrich Building Systems, Inc.
4. Telling Industries

2.3 STUDS, RUNNERS AND FURRING

A. Framing Members - General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653, G40.

B. Studs: ASTM C 645, punched web complying with the following:

1. Protective coating: ASTM A 653, G40 galvanized coating.
2. Bracing: Where the wall finish does not adequately brace both flanges of studs, provide bracing or reduce allowable stresses for computing stud heights in compliance with requirements of the authorities having jurisdiction.
3. Uncoated Metal Thickness (Gage): Minimum 0.018 inch (Referenced as 25 gage), refer to the Drawings.

C. Top and Bottom Tracks: As recommended by the manufacturer of each stud type and of the same gage as the studs in same wall or partition, unless otherwise indicated on the Drawings. Provide unpunched, screwable tracks with 1-1/4-inch flanges.

D. Slip-Type Head Joints: To accommodate slab deflection where studs extend to the underside of beams, floor or roof slabs, secure at top with a deep leg, minimum 16-gage slip connection manufactured by one of the following:

1. Clark Dietrich; SLP-TRK Slotted Deflection Track.
2. MBA Building Supplies; FlatSteel Deflection Track.
3. Steel Network Inc. (The); VertiTrack VTD Series.
4. Telling Industries; Vertical Slip Track.

E. 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 by one of the following:

1. "Slotted Top Track" by Metal Lite, Inc.
2. "SLP-TRK" by Clark Dietrich, Inc. for fire-rated partitions.

3. "Fire Track System", Fire Track Corp.
4. Or other Code-compliant assemblies acceptable to the Architect.

F. Furring Channels: Minimum 0.018 inch thick (25-gage), galvanized, hat-shaped.

G. Horizontal stiffener, runner channels and bridging: Complying with ASTM A 1003, minimum 0.053 inch metal thick, channels fabricated of cold-rolled steel with flanges not less than 7/16-inch wide. Minimum weights as follows:

Channel Size	Flange Width	Pounds/1000 linear foot
3/4-inch	7/16-inch	300
1-1/2-inch	7/16-inch	475
2-inch	19/32-inch	590

H. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

2.4 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, minimum 0.062 inch diameter wire, or double strand of minimum 0.048 inch diameter wire.

B. Wire: ASTM A 641, Class 1 zinc coating, soft temper:

1. Hanger Wire: Minimum 0.12 inch diameter, unless otherwise indicated.
2. Diagonal Bracing Wire: 0.08 inch diameter, unless otherwise indicated.
3. Tie wire: 0.05 inch diameter, single-strand annealed steel or 0.04 inch diameter, galvanized, double-strand annealed steel.

C. Metal Channels Supporting Suspended Ceilings (Carrying Channels): Provide metal channels complying with ASTM C 641, galvanized in compliance with ASTM A 924, G60 coating designation, for framing, furring and stiffening, as follows:

Size	Type	Pounds per 1,000 linear feet
3/4 inch	Cold-rolled	300
1 inch	Hot-rolled	410
1-1/2 inches	Hot-rolled	475
2 inches	Cold-rolled	590

D. Furring Channels (Furring Members):

Retain "Cold-Rolled Channels," "Steel Studs and Runners," "Dimpled Steel Studs and Runners," "Hat-Shaped, Rigid Furring Channels," or "Resilient Furring Channels" Subparagraph below or, if more than one is required, indicate locations of each on Drawings.

1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum ½ inch wide flanges, 3/4 inch deep.
2. Steel Studs and Runners: ASTM C 645.
   a. Minimum Base-Metal Thickness: minimum 0.033 inch.
   b. Depth: As indicated on Drawings.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
   a. Minimum Base-Metal Thickness: Minimum 0.033 inch thickness>.
4. Resilient Furring Channels: 1/2inch deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical.

E. Direct Hung Suspension System (Alternate Method):

1. Cross Tees: 1-1/2 inch high double web .020 inch thick electro-galvanized steel with 15/16 inch wide capped flange face.
2. Wall Track: 1-1/2 inch to 1-5/8 inch inside dimensions .020 inch thick electro-galvanized steel with 15/16 inch to 1 inch wide top and bottom flange faces.
3. Acceptable Manufacturers:
   a. Drywall Suspension System, U.S. Gypsum
   b. System 640, Chicago Metallic Corp.
   c. Drywall Grid System, Armstrong Industries

F. 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.

2.5 FASTENERS AND ACCESSORIES

A. Screws: ASTM C 1002 for metal framing 0.024 inch thick (25-gage) and lighter; ASTM C 954 for heavier metal framing. Provide 3/8 inch head diameter, corrosion-resistant pan head screws; length and gage required by Code, or recommended by the metal framing manufacturer when not prescribed by Code.

B. Shot pins: 0.140-inch diameter low velocity powder-actuated drive pins equivalent to Ramset/Red Head No. 1508, or other as approved by Architect, with 7/8-inch minimum penetration into concrete.

C. Anchor bolts: ASTM A 307, non-headed type.

D. Expansion shields: FS FF-S-325, except do not use lead, fiber and plastic shields.

E. For low walls: Use "Floor Anchor" stud reinforcement by Pinquist Tool & Die Co., Inc., or approved substitute, at every stud.

F. Isolation Strip at Exterior Walls - Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/4 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 (610 mm) 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 WALL INSTALLATION

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

E. General:

1. Erect metal framing systems in compliance with their manufacturer's recommendations, the reference standards, the Drawings and these Specifications.
2. Use minimum 0.039 inch thick (20-gage) studs at the following locations:
   a. Each side of door openings.
   b. Where studs support backing plates, plumbing fixtures and wall-supported cabinets.
3. Do not attach metal framing to ducts, conduits or pipes. Do not allow metal framing and suspension wires to contact pipes.
4. Cut framing components squarely for a tight fit against abutting members. Erect framing plumb and level to provide solid backing for finish materials. Install all steel studs in a wall/partition so that their flanges point in the same direction.
5. Do not exceed a 1/8-inch in 10-foot deviation (non-cumulative) from true lines and levels, nor 1/4-inch from true position. Perform necessary remedial work on framing to achieve specified tolerances.

F. Wall/Partition Framing:

1. Layout partitions and permanently mark on slabs.
2. Align and securely anchor ceiling and floor tracks to building construction. Space anchors within 6 inches of ends of each track segment and at 24 inches o.c. maximum. Do not drive fasteners closer than 2 inches to slab or curb edge.
3. 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.
   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
4. 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.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

6. Frame all openings in stud walls. Provide double studs, closer spacing, and additional reinforcement as detailed or required at doorframes, interior windows and recesses for equipment.
7. Frame both sides of control joints in gypsum board surfaces with separate studs and a discontinuous runner; do not bridge the joint with system components or accessories.
8. Assemble corners using a minimum of 3 studs.
9. Install studs in single length, without joints, extending from floor to underside of floor or roof structure above, except where indicated on the Drawings to stop at or above suspended ceilings. Splicing studs is not permitted without the Architect's approval.
10. Where studs stop at or above suspended ceilings, unless otherwise indicated, brace every fourth stud (maximum) with opposite stud bracing at 45 deg. angles securely anchored to the floor or roof above.
11. Attaching studs to runner: Attach studs to tracks by friction fit for single stud gypsum board partitions.
12. Attach the following studs to runner tracks with screws or with a crimping tool in compliance with the stud manufacturer's instructions, except where indicated to be welded.
    a. Studs with gypsum board on only one side.
    b. Studs on each side of doors.
    c. Studs supporting wall hung plumbing fixtures.
    d. Studs supporting wall hung urinal screens, toilet compartments, cabinets and equipment.
    e. Attach corner studs, partition intersections, studs on each side of doorjambs, and other openings in walls/partitions as specified above.
13. Unless otherwise indicated, provide horizontal stiffeners consisting of 3/4-inch channels spaced at not more than 54 inches o.c. maximum in all partitions/walls supporting wall supported cabinets. Attach stiffeners to each stud.
    a. Provide an additional 3/4-inch channel 6 inches above door head and extend 2 stud spaces beyond jamb studs.
    b. Install channels in longest possible lengths, lap 12 inches and wire-tie at joints. Do not tie channels on opposite sides of staggered and double stud partitions together.
14. Double studs (face to face to form a tube) at locations adjacent to doors and openings. Extend studs at door openings to slab or deck above and anchor securely to bottom track (as specified in subparagraph 12.b. above) and to top slab or deck with clip angles.
    a. Locate additional studs not more than 2 inches from door and window frames, abutting partitions, partition corners, and other construction.
    b. Install a section of track over door and window frames with a clip angle at each end and attach securely to the adjacent vertical studs.
    c. Install cut-to-length studs at the location of vertical joints and at standard spacing over the doorframe header extending to the ceiling track.

15. Install studs 2 inches away from abutting concrete, steel columns or other structural elements. Extend the horizontal stiffeners and attach it to the structural element.
16. Provide additional framing, as required, for attachment of electrical boxes, fire extinguisher cabinets and similar items located in stud walls.

G. Furring:

1. Provide furring attached to concrete and metal framing to conceal utilities, furred soffits, and other furring as indicated.
2. Furring to receive gypsum board shall be screw-on channels directly attached to backing material, or applied over runner channels as applicable.
3. Furring to receive plaster shall be 3/4-inch cold-rolled channels wire tied to 1-1/2-inch runner channels.
4. Space furring as indicated for studs.

H. Install extra stud, furring members and angle runners at terminations of dry wall work, and at openings and where required for support of other work occurring in the dry wall work.

1. Install sheet metal strapping, studs, hat-shaped channels or stud runners in walls where shown on the Drawings or as required by the conditions of the installation, minimum same gage as stud framing, for the support and attachment of other work. Attach to stud framing with not less than three (3) screws per stud.

I. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

J. Curved Partitions:
1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
2. 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 (150 mm) o.c.

3.4 INSTALLING CEILING & SOFFIT SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend 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. Do not attach wires to, or bend around, interfering material such as ductwork, pipes and conduits
   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. Do not attach hangers to steel roof deck.
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
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. 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. Space main runners not over 4 feet O.C. in any dimension so that hanger wires do not support more than 12 square foot of ceiling.

G. Hang suspended framing independent of walls, columns, pipes, ducts, and conduits, and their insulation.

H. Space runner channels not more than 6 inches from parallel walls or beams.

1. Align runner channels accurately relative to indicated ceiling height and saddle-tie with hanger wires.
2. Lap channels 12 inches at splices and tie at each end of lap.

I. Attach furring channels to runner channels at right angles to carrying channels with clips or with 0.05 inch diameter tie wire with triple wrap and triple twist.

1. Space at not over 12 inches O.C. for lath/plaster assemblies, and 16 inches O.C. for gypsum board.
2. Locate approximately 2 inches from parallel walls.
3. Lap channels 12 inches at splices and wire-tie at each end of lap.

4. Assemble and install metal grillage so that it is rigid, square, and free of movement, and level within the tolerances specified.
5. At control joints, provide discontinuous lap in main runners occurring over joints.
    a. Do not bridge joints with cross furring where joints run perpendicular to furring.
    b. Where joints run parallel to furring, provide furring to support each side of joint.

J. Provide recesses and openings where indicated for lighting fixtures, registers, access panels and other items to be installed in ceilings. Provide additional furring channels where required by opening condition.

K. 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.

3.5 INSTALLATION OF DIRECT HUNG CEILING SYSTEM (ALTERNATE METHOD)

A. Install direct hung ceiling (interior) system in accordance with the manufacturer's printed instructions and as specified herein. Comply with ANSI A97.2 and as further specified. Furnish and install hanger devices in coordination with other work.

B. Interconnect main furring runners with furring tees at 24 inches o.c. Install furring tees on all four sides around recessed lighting fixtures and other openings in ceiling.

C. Install additional hangers around light fixtures as required to support additional weights of light fixtures. Verify weights of light fixtures prior to installation of suspension system and hangers. Wrap hanger wires tightly at least three full turns.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products: Trim Accessories: Full-size sample, 12-inch long, for each trim accessory indicated

1.3 QUALITY ASSURANCE

A. Mockups: When required on Drawings, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for level of gypsum board finish indicated on the drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. 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 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements**, provide products by the following:**

1. CertainTeed Corp.
2. Georgia-Pacific Gypsum LLC.
3. Lafarge North America Inc.
4. National Gypsum Company.
5. USG Corporation.

B. Gypsum Board: Complying with FS SS-L-30 and ASTM C 36, ASTM C 630 and ASTM C 1396; tapered with beveled or radial edge for all finished joints, thickness as shown on the Drawings:
   1. Gypsum Wall Board
   2. Gypsum Board, Type X or Type C
   3. Flexible Gypsum Board
   4. Gypsum Ceiling Board
   5. Foil-Backed Gypsum Board
   6. Abuse-Resistant Gypsum Board: Level 1, 2 or 3 as indicated on drawings.
   7. Moisture- and Mold-Resistant Gypsum Board
   8. Glass-Mat Interior Gypsum Board

C. Gypsum Abuse and Moisture Resistant Board: Complying with ASTM C 1278 & ASTM C 1629, Level 1, Level 2, Level 3 for soft and hard body impact resistance, high traffic area, impact and abrasion resistant, moisture and mold resistant, and fire resistant gypsum board panels with tapered edges for all finished joints.
   1. Mold Resistance: ASTM D 3273, score of not less than 8.
   2. Products: Subject to compliance with the specified requirements provide one of the following:
      a. Aqua Tough Interior Panels, USG.
      b. Hi-Impact XP, National Gypsum.
      c. Protecta HIR 300 Type X, Lafarge.

D. Moisture and Mold Resistant Gypsum Wallboard: Non-combustible moisture and mold resistant gypsum core encased in moisture resistant front and back paper or fiberglass faces or with paperless faces, complying with ASTM C 36, ASTM C 630, ASTM C 1396 and ASTM D 3273, score not less than 8, tapered with beveled or radial edge for all finished joints, thickness as shown on the Drawings.

E. Gypsum Ceiling Board: Complying with ASTM C 1395; sag resistant, tapered with beveled or radial edge for all finished joints, 1/2 inch thickness, regular and Grade X (fire-rated).

F. Exterior Ceiling/Soffit Board: Weather and sag resistant gypsum board with beige water repellent paper facing, complying with ASTM C 931 & ASTM C 1396; tapered edge for all finished joints, thickness as shown on the Drawings, regular and Grade X (fire-rated).

G. TILE BACKING PANELS
   1. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, ASTM D 3273/D 3274, with manufacturer's standard edges.

2. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, ASTM D 3273/D 3274, ANSI A118.9, with manufacturer's standard edges.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized steel sheet or rigid PVC.
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.
g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

C. Control Joints: Roll formed zinc or extruded vinyl as standard with the wallboard manufacturer.

2.4 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 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 or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels: As recommended by manufacturer.

2.5 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 (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. 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. 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).

F. Isolation Strip at Exterior Walls - Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/4 inch thick, in width to suit steel stud size.

G. Electrical Box Pads: Moldable Polybutene pads, minimum 1/8 inch thick, , provide on the following:

1. Lowery's Electrical Box Pads, Harry A. Lowery & Associates, Inc., Sun Valley, CA 91352.
2. 3M Putty Pads, 3M Fire Protection Products, St. Paul, MN 55144.
3. Series SSP, Specified Technologies Inc., Sommerville, NJ 08876.

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.

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 (1.5 mm) 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. (0.7 sq. m) 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- (6.4- to 9.5-mm-) 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- (6.4- to 12.7-mm-) 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.

K. Exterior Wall: Install foam gasket isolation strip at all locations abutting exterior wall. Seal each side with acoustic sealant.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Regular Type: Vertical and horizontal surfaces, unless otherwise indicated.
2. Type X & C: Where required for fire resistance rated assembly.
3. Ceiling Board: All ceilings unless noted otherwise.
4. Exterior Ceiling/Soffit Board: Interior shower areas and wet areas
5. Water Resistant: Toilet and wet area walls not covered by tile.
6. Abuse Resistant Type: Where indicated on the Drawings
7. Moisture and Mold Resistant Type: Food preparation areas, showers and shower rooms and wet utility areas, unless otherwise indicated on the Drawings.
8. Foil-Backed Type: Where indicated on the drawings.
9. Tile Backer Panels: At all tile locations.

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 (400 mm) 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.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at **locations indicated to receive tile**. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at **locations indicated to receive tile**.

C. 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 in accordance with the following:
   1. Install control joints according to ASTM C 840.
   2. In specific locations as drawn for visual effect.
   3. Where a partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
   4. Where a wall or partition runs in an uninterrupted straight plane exceeding 30 lineal feet.
   5. Interior Ceilings with Perimeter Relief: Install control joints so that linear dimensions between control joints does not exceed 50 ft and total area between control joints does not exceed 2,500 sq. ft. Install a control joint or intermediate blocking where ceiling framing members change direction.
   6. Interior Ceilings without Perimeter Relief: Install control joints so that linear dimensions between control joints does not exceed 30 ft and total area between control joints does not exceed 900 sq. ft. install a control joint or intermediate blocking where ceiling framing members change direction.

C. Interior Trim: Install in the following locations:

   1. Cornerbead: Use at outside corners unless otherwise indicated.
   2. LC-Bead: Use at exposed panel edges.
   3. Tear-Away Bead: Use at exposed panel edges.

3.6 INSTALLATION OF TILE BACKER BOARD

A. Install tile backer board on walls to receive ceramic and/or stone tile; on plumbing fixture wet walls, in toilet areas, shower areas, baths, showers and bath tub surrounds and other wet area walls shown on the Drawings. Install cementitious backer units and

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

B. Support ends of boards over framing. Fasten boards to studs with 1-1/4 inch long screws spaced 16 inches o.c. and at perimeter 8 inches o.c. not less than 3/8 inch nor more than 5/8 inch for board edges.

C. Prefill joints with latex-portland cement mortar, then embed backer board manufacturer's or manufacturer approved tape and level the joints.

D. Install water resistant gypsum wallboard of the same thickness above tile backer board on walls with ceramic tile wainscot and full height on other walls in toilet rooms and wet areas.

3.7 INSTALLATION OF ELECTRICAL BOX PADS

A. Install acoustical electrical box pads over all electrical and other type of device boxes in sound rated walls, including but necessarily limited to electrical junction boxes, electrical switch boxes, power outlet receptacle boxes, thermostat control boxes, telephone outlet boxes and television cable or antenna outlet boxes.

B. Install in accordance with the printed installation instructions of the manufacturer.

C. Brush or wipe dust and dirt from box surface. If surface is contaminated with oil or other material that would impair pad application, wipe with Xylene or Toloulene to remove.

D. Center pad on back of box and mold around conduit or cable entering box. Mold pad around all sides covering all openings.

3.8 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 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.
3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
   a. Primer and its application to surfaces are specified in other Division 9 Sections.
4. Level 5: Where indicated on Drawings. Finish ceiling (and wall) areas to Level 4 gypsum board finishing followed by an application of a thin skim coat of joint compound over the entire ceiling surface.

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.

3.9 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 093013 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass mosaic tile.
2. Porcelain tile.
3. Stone tile.
4. Tile backing panels.
5. Waterproof membrane for thinset applications.
6. Crack isolation membrane.
7. Metal edge strips.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Where indicated, submit shop drawings of tile installation. Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples:

1. Samples one (1) of each type and finish of tile through range of color, with grouted joints.
2. Sample of each tile trim shape.
3. Samples of colored grout through full range of colors.
4. 12 inch x 12 inch samples of marble and/or granite tile
5. 6 inch long samples of metal transition strips.
6. 6 inch x 6 inch samples of anti-fracture and/or waterproofing membrane on suitable backing material.

D. Certification: Copies of waterproofing membrane manufacturer's certification that the anti-fracture and/or waterproofing membrane materials are compatible with the setting materials to be used in the installation.

1.3 QUALITY ASSURANCE

A. Provide material and installation complying with following:

1. Tile Council of North America Inc. (TCNA):
   a. Handbook for Ceramic Tile Installation, current edition.
2. American National Standards Institute Specifications for:

a. Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar, A108.1:
   1) Ceramic Mosaic Tile Installed with Dry-Set Portland Cement Mortar, or Latex-Portland Cement Mortar, A108.5
   2) Dry-Set Portland Cement Mortar, A118.1
   3) Latex-Portland Cement Mortar, A118.4
   4) Waterproofing Membrane, A118.10
   5) Anti-Fracture Membrane: A118.12
   6) Grout, A118.6 and A108.10
   7) Epoxy Mortar and Grout, A108.6 & A118.8
   8) Recommended Standard Specifications for Ceramic Tile, A137.1

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Mockups: Where indicated on the Drawings. Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. 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 MANUFACTURERS

A. Tile Setting Materials:

1. Latricrete International, Inc.; Bethany, CT 06525.
2. Mapei Corporation, Elk Grove Village, IL 60007.
3. Hydroment, Bostik Findley, Inc., Middleton, MA 01949.

2.2 MATERIALS

A. Floor & Wall Tile: Tile types, sizes, colors, patterns, products and manufacturers are indicated on the Drawings. Furnish trim shapes as required by conditions; angles, corners, bullnose, and other shapes required by installation conditions.

B. Glass Tile: Tile sizes, colors, patterns, products and manufacturers are indicated on the Drawings.

C. Marble Tile: Marble tile meeting ASTM C 503. Marble tile types, sizes, colors, patterns, finishes and distributors are indicated on the Drawings.

D. Granite Tile: Granite tile meeting ASTM C 615. Marble tile types, sizes, colors, patterns, finishes and distributors are indicated on the Drawings.

E. Aluminum Extrusion Threshold: ASTM B 221, 6063-T5 alloy and temper G. S. 10A-T5; with mill finish, sizes and shapes as shown on the Drawings.

F. Transition Strips: Extruded aluminum or galvanized steel "L" strips with zinc alloy exposed top edge, 1/4 inch height x 1-1/2 inches long x 1/8 inch thick, as manufactured by one of the following:

1. Terrazzo Marble & Supply, Chicago, IL 60636.
2. Tesco Products, Inc., Valencia, CA 91355.
3. Schluter-Systems L.P., Plattsburgh, NY 12901.

G. Latex-Portland Cement Mortar for Thin-Set or Tile Bond Coat for Bed-Set (Public Toilet Rooms, Public Showers, Locker Rooms & Swimming Pools): Prepackaged dry-mortar mix combined with liquid-latex additive. Provide one of the following:

1. Laticrete No. 211, Laticrete
2. Kerabond, Mapei
3. Tile-Mate Floor & Wall, Bostik Hydroment

H. Latex-Portland Cement Mortar for Thin-Set of Large Format Floor and Wall Tile: Prepackaged dry-mortar mix combined with water additive. Provide one of the following:

1. Laticrete Sure Set, Laticrete
2. Ultraflex LFT, Mapei
3. StoneWall, Bostik Hydroment

I. Glass Tile Mortar:

1. Glass Tile Adhesive Mortar, Laticrete
2. Adesilex P10, Mapei.
3. D-70 Pro-Flex, Bostik Hydroment

J. Floor and Wall Grout (Colored): Un-sanded, for joints less than 1/8 inch wide.

1. 1600 Series Unsanded Grout, Laticrete
2. Keracolor U, Mapei
3. Dry Tile Grout, Unsanded, Bostik Hydroment

K. Floor and Wall Grout (Colored): Sanded for joints 1/8 inch wide and greater.

1. 1500 Series, Sanded, Laticrete
2. Keracolor S, or Ultracolor Plus Mapei
3. Ceramic Tile Grout, Sanded, Bostik Hydroment

L. Latex Liquid Additive:

1. Laticrete No. 4237 for mortar and No. 1776 for grout, Laticrete
2. Keraply for mortar, Mapei

3. 425 Multi-Purpose Acrylic Latex Admixture, Bostik Hydroment

M. Epoxy Mortar:

1. Latapoxy No. 300 epoxy adhesive, Laticrete.
2. Kerapoxy 410, Mapei
3. EzPoxy, Bostik Hydroment

N. Epoxy Grout:

1. Latapoxy No. 2000 epoxy grout, with Part D for Non-Sag vertical installations, colored Laticrete.
2. Kerapoxy 400, colored Mapei
3. EzPoxy, Bostik Hydroment

O. Epoxy Grout: with antimicrobial additive.

1. SpectraLOCK PRO Grout, Laticrete
2. Opticolor, Mapei
3. Epoxy Mortar and Grout, Bostik Hydroment

P. Anti-Fracture Membrane (For thin-set floor tile): Factory prepackaged one part liquid rubber or two-part synthetic polymer and powder for trowel application with glass fiber fabric reinforcing compatible with setting materials:

1. Laticrete Blue 92, Laticrete
2. Mapelastic HPG, Mapei.
3. Ultra-Set, Bostik Hydroment

Q. Waterproofing Membrane (For thin-set tile): Factory prepackaged one part liquid rubber or two-part synthetic polymer and powder for trowel application with glass fiber fabric reinforcing compatible with setting materials one of the following:

1. Laticrete 9235 Waterproofing Membrane, Laticrete.
2. Mapelastic 315, Mapei
3. Ultra-Set Advanced, Bostik Hydroment

R. Grout Joint Sealer: Clear penetrating siliconized product compatible with the grout and tile materials used and approved by the grout and tile manufacturer. Provide sealer which is non-yellowing and will not change the appearance in texture or coloring of the grout and tile after application.

S. Penetrating Sealer for Honed Finish Stone Tile: Clear penetrating sealer compatible with the grout and stone materials used and approved by the grout and tile manufacturer. Provide sealer which is non-yellowing and will not change the texture or color of the grout and tile after application.
1. Dupont Stonetech Professional Bulletproof Sealer.

2.3 PROPORTIONING MORTAR AND GROUT

A. General:

1. When factory premixed grout is used in the installation with latex liquid additives, provide both products produced by the same manufacturer to ensure compatibility.
2. When factory premixed dry-set mortar is used in the installation with latex liquid additives, provide both products produced by the same manufacturer to ensure compatibility.
3. Anti-Fracture and Waterproofing Membrane: When used in the installation, provide a product produced by the same manufacturer as mortar to ensure compatibility.
4. The grout and mortar used in the installation may be from different manufacturers.
5. Mix mortar and grout in accordance with the manufacturer's printed instructions.

B. Floor and Wall Thin-Set Mortar: Factory premix with water or latex additive added in accordance with the manufacturer's recommendations.

C. Floor and Wall Epoxy Mortar: Factory two or three part premix combined and mixed in accordance with the manufacturer's recommendations.

D. Dry-Set Grout: Factory premix with water or latex additive added in accordance with the manufacturer's recommendations.

E. Epoxy Grout: Factory two or three part premix combined and mixed in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Alkalinity and Adhesion Testing: Perform tests recommended by setting materials manufacturer. Proceed with installation only after substrates pass testing.

C. Test for Moisture:

1. Test floor slab for moisture by anhydrous calcium chloride method according to ASTM F 1869. Proceed with tile installation only after substrates have maximum moisture-vapor-emission rate recommended by the setting bed material and tile manufacturers. Proceed with installation only after substrates pass testing.
2. Test floor slab for relative humidity by ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Proceed with installation only after substrates have maximum level humidity in the floor slab recommended by the setting bed material and tile manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. Examine all surfaces to receive the parts of the Work specified herein. Verify all dimensions of in-place and subsequent construction. Verify that water resistant gypsum wallboard and tile backer board is installed and prepared in accordance with Gypsum Association GA 216-75. Application of materials constitutes acceptance of the substrate.

B. Do not start work until grounds, anchors, plugs, hangers, bucks, etc. have been installed and until adjoining work is satisfactorily protected.

C. Keep containers in which tile and other materials are packed dry until tiles and other materials are removed and every precaution taken to see that tiles are not stained before they are set in place. Maintain temperatures in rooms where tile is being set at a minimum of 40 degrees F.

D. Clean, mechanically etch or scabble concrete and wall surfaces as required by conditions of the installation to maximize bond.

E. Layout tile in each area as shown on the Drawings in such a manner as to minimize the cutting of tile.

F. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION – GENERAL

A. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

C. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Glass and Ceramic Mosaic Tile: 1/16 inch.
2. Large Format Floor Tile: 1/8 inch
3. Glazed Wall Tile: 1/16 inch.
4. Large Format Wall Tile: 1/8 inch
5. Decorative Thin Wall Tile: 1/16 inch.
6. Stone Tile: 1/16 inch.

F. Movement Joints:

1. Construct movement (expansion & control) joints by installing wood strips extending through setting bed.
2. Provide width of such joints as shown on the Drawings, but not less than 1/8 inch for ceramic mosaic and glazed tile and not less than 1/4 inch for quarry tile.
3. If locations of such joints are not shown, install at restraining surfaces, such as walls, curbs, columns, pipes, over expansion joints in backing, at changes in backing material in accordance with TCNA Handbook EJ-171.
4. In large interior tiled areas provide movement joints not more than 20 to 25 feet o.c. each way for slabs on grade and 8 to 12 feet o.c. for elevated slabs.
5. After tile has set for three days, remove the wood strips, clean and repair the joints.
6. Sealing of joints is included in Section 07 92 00.

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

3.4 INSTALLATION OF FLOOR TILE

A. Dry-Set (Thin-Set) Mortar, TCNA Method F122 : For tile installed over waterproofing membrane:

1. Waterproofing Membrane:
   a. Install waterproofing membrane and reinforcement fabric on cured above grade concrete slabs in accordance with the manufacturer's printed installation instructions. Allow the membrane to cure before proceeding with tile installation.
   b. Extend waterproofing membrane up adjacent perimeter walls and other vertical terminations not less than 6 inches. Install reinforcing mesh in membrane at floor/wall juncture extending mesh not less 6 inches up wall and out on the floor.
2. Floor Tile:
   a. Spread dry-set mortar on substrate in a minimum 3/32 inch thickness. Spread mortar with flat side of trowel and comb with serrated or notched side of trowel.
   b. Place tile in position with a slight twisting motion using sufficient pressure to set tile firmly in mortar. Tap tile lightly to ensure maximum bond. Set tile before a skin forms on mortar.
   c. Wipe tile clean with a soft damp cloth. Avoid excess use of water.

B. Dry-Set (Thin-Set) Mortar, TCNA Method F125A : For tile installed over anti-fracture membrane:

1. Anti-Fracture Membrane: Install anti-fracture membrane and reinforcement fabric on cured above grade concrete slabs in accordance with the manufacturer's printed installation instructions. Allow the membrane to cure before proceeding with tile installation.
2. Floor Tile:
   a. Spread dry-set mortar on substrate in a minimum 3/32 inch thickness. Spread mortar with flat side of trowel and comb with serrated or notched side of trowel.
   b. Place tile in position with a slight twisting motion using sufficient pressure to set tile firmly in mortar. Tap tile lightly to ensure maximum bond. Set tile before a skin forms on mortar.
   c. Wipe tile clean with a soft damp cloth. Avoid excess use of water.

C. Epoxy Mortar (Thin-Set) and Grout: TCNA Method F131; For tile set with epoxy mortar and grout:

1. Floor Tile:
   a. Spread mortar on substrate in a minimum 3/32 inch thickness. Spread mortar with flat side of trowel and comb with serrated or notched side of trowel.
   b. Place tile in position with a slight twisting motion using sufficient pressure to set tile firmly in mortar. Tap tile lightly to ensure maximum bond. Set tile before a skin forms on mortar.
   c. Wipe tile clean with a soft damp cloth. Avoid excess use of water.

3.5 INSTALLATION OF WALL TILE

A. Concrete Unit Masonry, TCNA Method W202, Gypsum Wallboard (Wet Areas), TCNA Method W243 and TCNA Method W244 Tile Baker Units, Dry-Set:

1. Tile on Tile Backer Board: Apply latex Portland-cement mortar, forcing it through the tape to completely fill and level the joints. Apply in several passes to accomplish level joints.

2. Spread dry-set mortar on substrate in a minimum 3/32 inch thickness. Spread mortar with flat side of trowel and comb with serrated or notched side of trowel.
3. Place tile base in position with a slight twisting motion using sufficient pressure to set tile firmly in mortar. Tap tile lightly to ensure maximum bond. Set tile before a skin forms on mortar.
4. Keep joints straight and uniform in width not exceeding 1/16 inch, align with floor joints. Wipe tile clean with a soft damp cloth. Avoid excess use of water.

3.6 GROUTING

A. After tile is firmly set, fill joints with appropriate Latex Dry-Set grout. Spread slurry of grout over the floor surfaces until joints are filled. On walls, after tile has set, remove string or rope spacers, if any, and force a maximum of grout into joints by trowel, squeegee, brush or finger application. Fill joints flush with surface of tile. Before grout sets, fill all skips and gaps. Tool joints to cushion edge of tile. Remove surface laitance and excess grout with dry polishing cloths. Provide faces of all tile, clean and free from grout or other stains.

B. Cure floor grout by keeping damp for at least 72 hours. Add dampness as needed. Cover with polyethylene sheeting to facilitate curing.

3.7 INSTALLATION OF THRESHOLDS

A. Metal Edge Strips: Install at locations indicated and where tile flooring meets unfinished subfloor and no threshold is indicated.

3.8 TILE BACKING PANEL INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.9 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.10 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.11 INSTALLATION TOLERANCES

A. Variation in Surface Plane of Flooring: Do not exceed 1/8 inch in 10 ft. (3 mm in 3 m) from level or slope indicated when tested with a 10-ft. (3-m) straightedge.

B. Variation in Plane between Adjacent Units (Lipping): Do not exceed the following differences between faces of adjacent units as measured from a straightedge parallel to stone tiled surface:

1. Units with Polished Faces: 1/64 inch (0.4 mm).
2. Units with Honed Faces: **1/64 inch (0.4 mm**)
3. Units with Sand-Rubbed Faces: 1/32 inch (0.8 mm).
4. Units with Thermal-Finished Faces: Depth of thermal finish or 3/16 inch (5 mm), whichever is less.
5. Units with Natural-Cleft Faces: Depth of natural-cleft finish or 3/16 inch (5 mm), whichever is less.

C. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch (1.6 mm) or one-fourth of nominal joint width, whichever is less.

D. Hand-Tight Joints: Do not exceed **1/64 inch (0.4 mm)**.

3.12 CLEANING AND SEALING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Do not use acid or acid cleaners.
3. Sponge and wash tile thoroughly, working diagonally across joints; polish with dry cloths.
4. Flush surfaces with clean water before and after cleaning.
5. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

C. Immediately prior to occupancy by the Owner, wash tile surfaces, again, and perform additional grouting that may be necessary.

D. After cleaning of tile and grout apply clear sealer to all grout joints. Wipe tiles clean of sealer residue.

E. Apply sealer to cleaned stone tile flooring according to sealer manufacturer's written instructions.

3.13 PROTECTION

A. Cover tile floors with non-staining building paper or polyethylene sheeting until just prior to occupancy by the Owner. During construction protect tiled areas used as walkways with plywood boards in addition to other covering specified.

END OF SECTION 093013

SECTION 095100 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Acoustical ceiling panels and suspension systems including, intermediate support framing when required by the conditions of the installation.

1.2 SUBMITTALS

A. Product Data: Materials description and installation and maintenance instructions.

B. Samples:

1. 12 inch square acoustical units for each type of unit.
2. 1 foot-0 inch lengths of each suspension system components with manufacturer's standard color selections.
3. 1 foot-0 inch lengths of edge trim system, with manufacturer's standard color selections.

1.3 QUALITY ASSURANCE

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.

B. Fire Test Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire response tests that were performed by UL, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Surface burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
3. Products are identified with appropriate markings of applicable testing and inspecting agency.

C. Source Limitations for Ceiling Units and Suspension Systems: Obtain each acoustical ceiling panel and suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.4 PROJECT/SITE CONDITIONS

A. Coordination: Coordinate with electrical, HVAC and fire protection trades to ensure edge configuration of light fixture, air diffusers and sprinkler heads to penetrate or to lay in ceilings are proper for the system and provide system layout that accommodates lighting pattern.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS

A. Product and manufacturer as indicated on the drawings.

2.2 SUSPENSION SYSTEMS

A. Product and manufacturer as indicated on the drawings.

B. General: Comply with ASTM C 635 intermediate duty and heavy duty, as applicable to the type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceiling, including light fixtures, HVAC equipment sprinklers and partition system.

C. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, direct hung. Coordinate types of devices compatible with floor construction, verify with precast concrete plank manufacturer.

D. Hanger Wires: Galvanized carbon steel, ASTM A 641, soft tempered, pre-stretched, yield stress load of at least three (3) times design load, but not less than 12 gage (0.016 inch).

E. Edge Molding: Zinc coated steel or aluminum, configurations shown on the Drawings, or if not shown manufacturer's standard for system with baked enamel finish to match suspension systems.

F. Cold-Rolled Intermediate Support Channels: Minimum 1-1/2 inch, 475 lbs. per 1,000 lin. ft., complying with ASTM A 1008.

G. Grid Clips: Ceiling manufacturer's standard clip for attachment of ceiling grid to cold-rolled intermediate support channels complying with the requirements of Code Section 27-350, RS-16, 51.1.4.

H. Decorative Edge Trim:

1. Ceiling system manufacturer’s standard fabricated extruded aluminum edge trim with baked enamel finish to match suspension systems.

2. Provide edge trim units fabricated with concealed splices the same thickness and material as trim units.
3. Provide concealed attachment clips for attaching edge trim to ends of grid members.
4. Products: Provide one of the following:
   a. Axion, Armstrong
   b. Cloud Perimeter Trim, Certainteed
   c. Compasso, USG
   d. Infinity Perimeter Trim, Chicago Metallic

2.3 MISCELLANEOUS MATERIALS

A. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

   1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
   2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
   3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings. Application or installation of materials constitutes acceptance of the supporting construction.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

3.2 INSTALLATION OF SUSPENSION SYSTEM

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. System Installation:

1. Unless otherwise shown on the Drawings or required by the systems manufacturer's printed installation instructions, install hangers 4 ft. o.c. in rows 4 ft. apart.
2. Do not attach hangers to steel roof deck. Attach hangers to structural members.
3. Furnishing inserts and intermediate support framing and directing placement of inserts and framing is the responsibility of the acoustical ceilings installer.
4. Where supporting construction is steel, wrap the wire hanger around or through the steel member or attach by other secure methods.
5. Wrap hanger around carrying channel, or if directly suspended, insert through hole in main tee and secure hanger with at least three (3) turns around itself.
6. Intermediate Support Channels:
    a. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, or where spacing of primary support does accommodate hangar spacing, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications
    b. When required by the conditions of the installation, install intermediate support cold-rolled channels spaced not more than 4 feet-6 inches above direct hung ceiling grid system.
    c. Grid Clips: Install ceiling manufacturer's standard grid clips attached to cold-rolled channels and direct hung ceiling grid system not more than 4 feet-0 inches o.c.
7. Ceiling Grid: Install direct hung ceiling grid system to the ceiling panel model sizes shown on the Drawings and in accordance with the manufacturer's printed installation instructions.

C. Coordinate spacing of hangers, carrying channels, runners, and molding with the location of ductwork, piping, conduit, electrical fixtures and other items occurring in or on ceilings.

D. Provide additional hangers at corners of light fixtures at midpoint of cross tees adjacent to light fixtures and duct outlets and adjacent to main tee splices.

E. Decorative Edge Trim:

1. Install edge trim moldings where indicated on the Drawings and elsewhere as needed to conceal edges of acoustical units and suspenson grid which would otherwise be exposed to view after completion of the Work.
2. Install edge trim on edges of ceiling grid with conceal clip system to conceal edges of grid system.

3.3 INSTALLATION OF PANELS

A. Install acoustical panels in coordination with suspension system with edges concealed by support of suspension members and faces flush with grid webs. Arrange acoustical units and orient directionally patterned units in the configurations shown on the reflected ceiling plans and as directed by the Architect.

B. Scribe or cut panels to fit accurately at penetrations.

C. Use procedures that will minimize damage or soiling of the units during installation. Replace units which are damaged or cannot be adequately cleaned, as directed by the Architect at no additional cost to the Owner.

D. Provide ceiling panel manufacturer's standard hold-down (retention) clips where shown or noted on the Drawings, or where required by conditions of the installation.

3.4 CLEANING AND PROTECTION

A. Upon completion of the Work remove all unused materials, debris, containers and equipment form the project site. Clean and repair floors, walls and other surfaces that have been stained, marred or otherwise damaged by work under this Section.

B. Protect acoustical ceilings during the construction period so that they will be without any indication of deterioration or damage at the time of acceptance by Owner.

END OF SECTION 095113

SECTION 096513 - RESILIENT FLOORING, BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base and accessories
2. Vinyl flooring

1.2 SUBMITTALS

A. Product Data: For each type of product, including installation and maintenance instructions.

B. Samples:
1. For each exposed base and accessory, for each color and texture specified, (3) 12 inches (300 mm) long samples.
2. For each flooring material, color and pattern, (3) 12” x 12” samples.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.4 PROJECT CONDITIONS

A. Do not install floor coverings over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by floor covering manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Resilient Base and Accessories:

1. Rubber: Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), TP (rubber, thermoplastic), Group I (solid, homogeneous); thickness 0.125" (3.2mm).
2. Base in coils in manufacturers standard lengths.
3. Outside and Inside Corners: Job formed or preformed.

B. Solid Vinyl Tile:
1. Types, sizes and manufacturers as indicated on the Drawings.
2. ASTM F 1700, Class I, monolithic vinyl tile Type A, smooth surface.
3. Minimum Thickness: 0.120 inches (3.0mm) or as indicated on Drawings.

C. Vinyl Composition Tile:
1. Types, sizes and manufacturers as indicated on the Drawings.
2. ASTM F 1066, Class 1, solid color or Class 2, through-pattern.
3. Minimum thickness: 0.125 inch (3.2mm).

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit products and substrate conditions indicated.

1. Adhesives shall have a VOC content of **50** g/L or less.
2. Rubber floor adhesives: 60 g/L or less.

C. Resilient Edge Strips: Vinyl 1 inch x 1/8 inch thick, beveled, straight and coved; color as selected from the manufacturer's standard colors. Provide manufacturer's standard shapes as shown on the Drawings.

D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Maintain spaces to receive sheet flooring materials at a minimum temperature of 70 degrees F.; maintained temperature during installation of flooring and for not less than 48 hours.

C. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Verify that slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by floor covering manufacturer. If test indicate incompatibility, remove in accordance with the flooring manufacturer's requirements
2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

D. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

E. Test for Moisture:

1. Test floor slab for moisture by anhydrous calcium chloride method according to ASTM F 1869. Proceed with resilient sheet flooring installation only after substrates have maximum moisture-vapor-emission rate recommended by the resilient sheet flooring and adhesive manufacturer. Proceed with installation only after substrates pass testing.
2. Test floor slab for humidity by ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Proceed with installation only after substrates have maximum level humidity in the floor slab recommended by the resilient sheet flooring and adhesive manufacturers. Proceed with installation only after substrates pass testing.

F. Do not start flooring work until base cabinets and all items that go through the flooring have been installed.

G. Do not install flooring until the installer has ascertained that the chemical treatment on substrates will not interfere with the successful application of the flooring materials.

H. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

I. Access Flooring Substrate: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

J. When solvent-based adhesives are used, ventilate spaces; use spark-proof fans if natural ventilation is inadequate. Prohibit all smoking.

K. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

A. Comply with base and adhesive manufacturers' written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, exterior wall as indicated on the drawings. Do not apply resilient base to millwork unless specifically indicated on the Drawings.

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 full coverage of adhesive evenly applied to substrate.

E. Preformed corners: Install preformed corners before installing straight pieces.

F. Job-formed corners: use straight pieces of maximum lengths possible and form with returns not less than six inches in length.

G. Do not use mitered corners.

H. Scribe base accurately to adjacent surfaces.

I. Do not stretch resilient base during installation.

J. Remove excessive adhesive in accordance with manufacturer's instructions.

3.3 RESILIENT FLOORING INSTALLATION

A. General
   1. Comply with manufacturers written instructions for installing resilient flooring.
   2. Mix and apply adhesive as recommended by the manufacturer. Cover surface evenly with full spread of adhesive. Maximum working area is not to be exceeded. Install flooring within time limits recommended. If adhesive films over or dries, remove the adhesive and recoat the area.
   3. Extend flooring into toe spaces, door reveals, closets, and similar openings. Extend flooring to center of door openings.
   4. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

5. Install flooring on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between flooring installed on covers and adjoining floor installation. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
6. Adhere flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
7. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
8. Remove excessive adhesive in accordance with sheet flooring manufacturer's instructions.

B. Resilient Tile Installation
1. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
2. Lay tiles square with room axis or in pattern indicated.
3. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
4. Lay tiles with grain running in one direction or as indicated on the Drawings.

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. Not less than 4 days after flooring installation, clean base. Wash thoroughly, with a cleaner recommended by the manufacturer, in accordance with manufacturer's printed instructions.

D. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

E. Cover floors with non-staining building paper or polyethylene sheeting until just prior to occupancy by the Owner. During construction, protect areas used as walkways with plywood boards in addition to other covering specified.

END OF SECTION 096513

SECTION 096800 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Modular carpet tile

1.2 SUBMITTALS

A. Product Data: For the following, including installation recommendations for each type of substrate:

   1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.

B. Shop Drawings: Show the following:

   1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
   2. Carpet type, color, and dye lot.
   3. Locations where dye lot changes occur.
   4. Type of installation.
   5. Pattern type, repeat size, location, direction, and starting point.
   6. Type, color, and location of edge, transition, and other accessory strips.
   7. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet Tile: (3) Full size samples.
   2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II or Master II certification level.

B. Comply with applicable portions of the Carpet and Rug Institute (CRI), CRI 104, Standard for Installation of Commercial Carpet.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

B. Deliver installation materials to project site in original factory containers, labeled with identification of manufacturer and brand name

C. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. Lay flat, blocked off ground. Maintain minimum temperature of 68 deg F at least three days prior to and during installation in area where materials are stored.

1.5 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Do not install carpet and carpet cushion over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article is not to deprive Owner of other rights Owner may have under other provisions of the Contract Documents and is in addition to, and is to run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge, dimensional stability and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

C. Special Warranty for Carpet Cushion: Manufacturer agrees to repair or replace components of carpet cushion installation that fail in materials or workmanship within specified warranty period.

1. Warranty includes consequent removal and replacement of carpet and accessories.
2. Warranty does not include deterioration or failure of carpet cushion due to unusual traffic, failure of substrate, vandalism, or abuse.
3. Failure includes, but is not limited to, permanent indentation or compression.
4. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET MATERIALS: Specification and manufacturer as indicated on the drawings.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet and/or cushion manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, release adhesive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer and/or carpet and carpet cushion manufacturers.

1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Latex Leveling Compound: As recommended by the carpet and padding manufacturers.

D. Resilient Edge/Transition Strips: Solid vinyl of profile and width shown.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet 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.

2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Test for Moisture:

    a. Test floor slab for moisture by anhydrous calcium chloride method according to ASTM F 1869. Proceed with carpet tile installation only after substrates have maximum moisture-vapor-emission rate recommended by the carpet tile and adhesive manufacturers. Proceed with installation only after substrates pass testing.
    b. Test floor slab for humidity by ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Proceed with installation only after substrates have maximum level humidity in the floor slab recommended by the carpet tile and adhesive manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. General: Comply with CRI 104, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.

C. 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 and cushion manufacturer.

D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

A. General:

1. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
2. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
3. 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.
4. Install pattern parallel to walls and borders to comply with CRI 104, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

B. Installation: Carpet Tile
1. Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
2. Installation Method:
   a. As recommended in writing by carpet tile manufacturer.
   b. Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
   c. Partial glue down; install periodic tiles with releasable, pressure-sensitive adhesive.
   d. Free lay; install carpet tiles without adhesive.
3. Maintain dye lot integrity. Do not mix dye lots in same areas.
4. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing carpet:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
2. Remove yarns that protrude from carpet surface.
3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI 104, "Protecting Indoor Installations."

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 096800

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Wall covering and installation.

1.2 SUBMITTALS

A. Product Data: Including material description, installation and maintenance.

B. Samples: 10 inch x 10 inch pieces for each color and pattern indicated on the Drawings.

C. Warranty: Signed copies of warranty specified herein.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide wall coverings with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Flame Spread: 25 or less
   2. Smoke Developed: 450 or less.

1.4 WARRANTY

A. Provide Manufacturer's warranty stating that the vinyl wall covering installations will be free of defects in workmanship and materials in accordance with the General Conditions and agreeing to repair or replace vinyl wall covering that is defective or becomes defective during the warranty period. The warranty period is to be for five (5) years instead of one (1) year.

PART 2 - PRODUCTS

2.1 WALLCOVERINGS

A. Refer to the Drawings for products, product numbers, colors, patterns and manufacturers.

2.2 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

1. Adhesive shall have a VOC content of **50** g/L or less.

B. Primer/Sealer: Mildew resistant, recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

C. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall-covering manufacturer.

1. Adhesive shall have a VOC content of **50** g/L or less.

D. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work. Verify that other work that penetrates the substrate has been completed before beginning wall covering installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Starting of work constitutes acceptance of substrate surface.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

D. Repair gypsum wallboard substrate by depressing any exposed nails and screws. Fill cracks and holes with joint compound or spackle.

E. Verify that plaster surfaces have a moisture content of less than 5 percent, verified by moisture meter

F. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

G. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

H. Alkaline surfaces such as concrete block, concrete or portland cement plaster, are to be primed with an alkyd primer.

3.3 WALL-COVERING INSTALLATION

A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Use wall covering rolls in consecutive numerical sequence of manufacturer. Place wall covering panels consecutively in exact order they are cut from the roll including fill in at all spaces above or below windows, doors or similar penetrations. Hang wall covering by reversing alternate strips except on match patterns.

C. Trim deeply textured strip matched patterns on a work table with a metal straight edge and an industrial razor blade. Trim additional selvage where required to achieve a color and pattern match at seams.

D. Follow the manufacturer's printed instructions for mixing adhesive. Adhesive is to be at room temperature. Apply adhesive to wall covering back using a roller or paste brush to fill pores of wall covering and produce a smooth layer.

E. Hang non-matched patterns by overlapping the edges and double cutting through both thicknesses with a 0.04 or 0.06 inch thick zinc or aluminum strip backup to prevent cutting the substrate. Wrap wall covering 6 inches beyond inside and outside corners. Do not cut wall covering at corners. Horizontal seams are not allowed.

F. Remove and replace hardware, accessories, plates or similar items to allow wall covering to cover underlying substrate.

G. Apply wall covering to surfaces immediately or as long as adhesive remains tacky.

H. Remove excess adhesive immediately, using warm water and dry sponge or dry cloth towel.

I. The installed wall covering is to be secure, smooth, clean and without wrinkles, gaps or overlaps.

J. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

A. Upon completion of work, remove all adhesive spots from floors, glass and other surfaces. Remove all rubbish and accumulated material of whatever nature not caused by other trades from the project site and leave work in a clean, orderly and acceptable condition.

B. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

C. Use cleaning methods recommended in writing by wall-covering manufacturer.

D. Replace strips that cannot be cleaned.

E. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1. Painting and finishing of interior exposed items and surfaces as specified herein and scheduled and noted on the Drawings.
2. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other Sections, except as otherwise specified.
3. Paint as used herein means all coating system materials, including primers, emulsions, enamels, sealers and fillers and other applied materials whether used as prime, intermediate or finish coats.
4. Paint all exposed surfaces except where the natural finish of the material is obviously intended and specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.

B. The following categories of work are not included as part of the painter applied finish work or are included in other Sections of these Specifications, unless otherwise shown or specified.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various Sections for structural steel, metal fabrications, ornamental metal fabrications, hollow metal work and similar items.
2. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory finishing or installer finishing is specified for such items as (but not limited to) toilet enclosures, acoustic materials and casework.
3. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and inaccessible areas, furred areas, spaces and duct shafts.
4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, aluminum paint finish system, stainless steel, chromium-plated, copper, bronze and similar finished materials will not required finish painting, except as otherwise indicated.
5. Operating Parts and Labels: Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated. Do not paint over any code required labels, such as UL name or nomenclature plates.

1.2 SUBMITTALS

A. Samples for Verification: For each type of paint system and in each color and gloss of topcoat. Submit samples on rigid backing, 8 inches square.

1.3 FIELD CONDITIONS

A. Starting of painting work will constitute the applicator's acceptance of the surfaces and conditions within any particular area.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to the formation of a durable paint film.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Proprietary names used to designate colors or materials are not intended to imply that products of the manufacturers are required to the exclusion of equivalent products of other named manufacturers, but the Architect is to be informed in writing of all manufacturers and materials used on the job for various colors and finishes.

B. Manufacturers: Subject to compliance with requirements provide products by one of the following:
   1. Benjamin Moore & Co.
   2. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Provide the best quality grade of the various types of coatings as regularly manufactured by approved paint materials manufacturers. Materials not displaying the manufacturer's identification as a well-known standard, best grade product will not be acceptable.

C. Material Compatibility:

   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

3. Provide barrier coats over incompatible primers or remove and reprime as required for specified finish coat.

D. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction[and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and recommendations in “MPI Manual” applicable to substrates indicated and as herein specified for each particular substrate condition.
2. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures and similar items in-place and not to be finish painted or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet newly painted surfaces.

B. Cementitious Materials:

1. Prepare cementitious surfaces to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils and by roughening as required to remove glaze.
2. Determine the alkalinity and moisture content of the surface to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds that permitted in manufacturer's printed directions.

A. Wood:

1. Clean wood surfaces to be painted of all dirt, oil or other foreign substance with scrapers, mineral spirits and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other paint manufacturer approved sealer, before application of the priming coat. After priming fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.
2. Prime, stain or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, face, undersides and backsides of such wood. When transparent finish is required, use spar varnish for back priming.

3. Seal tops and bottoms of wood door with a heavy coat of varnish or equivalent sealer immediately upon delivery to the job.

B. Ferrous Metals:

1. Clean ferrous surfaces which are not galvanized or shop coated of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
2. Remove rust from surfaces to bare metal in accordance with SP3 "Power Tool Cleaning".
3. Exercise care not to remove galvanizing.
4. Touch up shop applied prime coats wherever damaged or bare, where required by other Sections of these Specifications. Clean and touch up with the same type shop primer.

C. Galvanized Metal: Clean free of all oil and other surface contaminants with a non-petroleum base solvent recommended by paint manufacturer.

D. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

E. Gypsum Wallboard:

1. Fill cracks and voids with spackling compound.
2. Apply primer over bare surfaces and newly applied texture coatings.

F. Previously coated surfaces

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, provide test results and recommendations from paint manufacturer to Architect.
7. Apply specified primer to surfaces scheduled to receive coatings.

3.3 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and, if necessary, strain the material before using.

3.4 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Paint interior surfaces of ducts, where visible through registers or grilles with a flat, non-specular black paint.
6. Finish exterior doors on tops, bottoms, and side edges same as exterior faces, unless otherwise indicated.
7. Sand lightly between each succeeding enamel or varnish coat.
8. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
9. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
10. Prime all surfaces to receive vinyl, fabric, paper wall and other types of wall coverings, unless otherwise indicated.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Minimum Coating Thickness: Provide the following minimum coating thicknesses unless herein noted otherwise:

1. Apply each material at not less than the manufacturer's recommended spreading rate to provide a total dry film thickness of not less than 3 mils for the entire coating system of prime and finish coats of 3 coat work.
2. Provide a total dry film thickness of not less than 2 mils for the entire coating system of prime and finish coat for 2 coat work.

F. Prime Coats:

1. Apply a prime coat to material which is required to be painted or finished and which has not been prime coated by others.
2. Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
3. Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks or other surface imperfections.

G. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

H. Completed Work: Match reviewed samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

I. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes or other surface imperfections.

3.5 CLEANING AND PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damages by cleaning, repairing or replacing and repainting.

B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

C. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

D. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

E. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 PAINTING SCHEDULE

A. Interior - New Construction:

1. Gypsum Wallboard Walls for Eggshell Finish:
   a. One Coat:
      1) Moore Ecospec Interior Latex Primer Sealer (231)
      2) S-W Harmony Latex Wall Primer
   b. Two Coats:
      1) Moore Pristine Ecospec Interior Latex Eggshell (223)
      2) S-W Health Spec Latex Eggshell
2. Gypsum Wallboard Walls for Semi-Gloss Finish:
   a. One Coat:
      1) Moore Ecospec Interior Latex Primer Sealer (231)
      2) S-W Harmony Latex Wall Primer
   b. Two Coats:
      1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
      2) S-W Harmony Latex Semi-Gloss
3. Gypsum Wallboard Ceilings for Latex Flat Finish:
   a. One Coat:
      1) Moore Ecospec Interior Latex Primer Sealer (231)
      2) S-W Harmony Latex Wall Primer
   b. Two Coats:
      1) Moore Pristine Ecospec Interior Latex Flat (219)
      2) S-W Harmony Latex Flat
4. Concrete Unit Masonry and Concrete Walls for Eggshell Finish:
   a. One Coat
      1) Moore Moorcraft Super Craft Latex Block Filler No. 285P
      2) S-W PrepRite Block Filler
   b. Two Coats:
      1) Moore Pristine Ecospec Interior Latex Eggshell (223)
      2) S-W Harmony Latex Eggshell

5. Concrete Unit Masonry and Concrete Walls for Semi-Gloss Finish:
    a. One Coat
        1) Moore Moorcraft Super Craft Latex Block Filler No. 285P
        2) S-W PrepRite Block Filler
    b. Two Coats:
        1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
        2) S-W Harmony Latex Semi-Gloss
6. All Shop Primed Metal - H.M. Doors and Frames and Ferrous Metals for Semi-Gloss Finish:
    a. Sand, scrape and spot prime with compatible primer
    b. Two Coats:
        1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
        2) S-W Harmony Latex Semi-Gloss

7. All Unprimed Metal:
    a. On Galvanized Metal:
        1) Sand, scrape and spot prime with compatible primer.
        2) One (1) coat, acrylic latex galvanized metal primer, one of the following:
            a) Moore Super Spec HP
            b) S-W Pro Industrial Pro-Cryl
        3) Two Coats:
            a) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
            b) S-W Harmony Latex Semi-Gloss
    b. Unprimed Metal:
        1) Sand, scrape and spot prime with compatible primer
        2) One (1) coat acrylic rust inhibiting primer, one of the following:
            a) Moore Super Spec HP
            b) S-W Pro Industrial Pro-Cryl
        3) Two Coats:
            a) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
            b) S-W Harmony Latex Semi-Gloss
8. Gypsum Wallboard (scheduled for wall covering):
    a. One Coat:
        1) Moore Ecospec Interior Latex Primer Sealer (231)
        2) S-W Harmony Latex Primer
9. Exposed to View Overhead Construction:
    a. One (1) coat, acrylic or latex dry fall out spray, one of the following:
        1) Moore Sweep-Up Latex Flat
        2) S-W Waterborne Acrylic Dryfall
10. Architectural Woodwork, Window Frames, Wood Doors and Trim for Latex Semi-Gloss:
    a. One Coat:
        1) Moore Ecospec Interior Latex Primer Sealer (231)
        2) S-W Harmony Latex Primer
    b. Two Coats:

1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
2) S-W Harmony Latex Semi-Gloss

11. Exposed Structural Steel, Decorative Ferrous Metal and Handrails, Guardrails and Railings, indicate for high performance coating:
    a. Sand, scrape and spot prime with compatible primer.
    b. One coat, Epoxy-Polyamide Coating, 3.00 mild dry film thickness, one of the following:
        1) Tnemec Series N69 Hi-Build Epoxoline II
        2) PPG Ameron Amerliock 400 Hi-Build Epoxy
        3) Carboguard 825, Hi-Build Epoxy
    c. One coat, High-Build Acrylic Polyurethane Enamel 2 to 3 mils dry film thickness, one of the following, no substitutions:
        1) Series 73 (Semi-Gloss) Endura-Shield III Semi-Gloss, Tnemec Company, Inc. (1054 Gloss & 1075 High Gloss)
        2) PPG Ameron Amercoat 450H
        3) Carbothane 133 HB Semi-Gloss, Carobline

B. Interior - Existing Construction:

1. Gypsum Wallboard and Plaster Walls for Eggshell Finish:
    a. One Coat:
        1) Moore Pristine Ecospec Interior Latex Eggshell (223)
        2) S-W Harmony Latex Eggshell
2. Gypsum Wallboard and Plaster Walls for Semi-Gloss Finish:
    a. One Coat:
        1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
        2) S-W Harmony Latex Semi-Gloss
3. Gypsum Wallboard and Plaster Ceilings for Latex Flat Finish:
    a. One Coat:
        1) Moore Pristine Ecospec Interior Latex Flat (219)
        2) S-W Harmony Latex Flat
4. Concrete Unit Masonry Walls for Eggshell Finish:
    a. One Coat:
        1) Moore Pristine Ecospec Interior Latex eggshell (223)
        2) S-W Harmony Latex Eggshell
5. Concrete Unit Masonry Walls for Semi-Gloss Finish:
    a. One Coat:
        1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
        2) S-W Harmony Latex Semi-Gloss
6. H.M. Doors and Frames and Ferrous Metals for Semi-Gloss Finish:
    a. Sand, scrape and spot prime with compatible primer
    b. One Coat:
        1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
        2) S-W Harmony Latex Semi-Gloss
7. Architectural Woodwork, Window Frames, Wood Doors and Trim for Latex Semi-Gloss:

a. One Coat:
   1) Moore Pristine Ecospec Interior Latex Semi-Gloss (224)
   2) S-W Harmony Latex Semi-Gloss

3.7 CLEAN UP

A. Just prior to final completion and acceptance, examine all painted and finished surfaces and retouch or refinish as necessary and required, to leave all surfaces in perfect condition.

B. Upon completion of work, remove all paint and finishing spots and overspray from floors, glass and other surfaces. Remove all rubbish, containers and accumulated material of whatever nature not caused by other trades from the project site and level work in a clean, orderly and acceptable condition.

END OF SECTION 099123

SECTION 104413 - FIRE PROTECTION CABINETS

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. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

1. Show location of knockouts for hose valves.

B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers, fire hoses, hose valves, and hose racks indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.6 SEQUENCING

A. Apply vinyl lettering on field-painted fire-protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

B. Cabinet Construction: **1**-hour fire rated.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch- (1.09-mm-) thick cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Cold-rolled steel sheet.

1. Shelf: Same metal and finish as cabinet.

D. Recessed Cabinet:

1. Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as drywall bead.
2. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.

E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.

F. Cabinet Trim Material: Steel sheet.

G. Door Material: Steel sheet.

H. Door Style: Full acrylic bubble with frame. Flush opaque panel, frameless, with no exposed hinges.

I. Door Glazing: Molded acrylic bubble.
1. Acrylic Bubble Color: Clear, transparent.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard.
2. Provide concealed hinge permitting door to open 180 degrees.

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
3. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
4. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
5. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

    a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

        1) Location: Applied to cabinet door or cabinet glazing.
        2) Application Process**:** Pressure-sensitive vinyl letters.
        3) Lettering Color: Red
        4) Orientation: Vertical.

6. Alarm: Manufacturer's standard alarm that actuates when fire-protection cabinet door is opened and that is powered by batteries.

L. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

    a. Finish: Factory primed for field painting.
    b. Color: Match Architect's sample.

2. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3, 3 mm thick.
3. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear)].
4. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

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

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

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

3.2 PREPARATION

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated, if not indicated, at heights acceptable to authorities having jurisdiction.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification: Apply ***vinyl lettering*** at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

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 portable, hand-carried fire extinguishers

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguishers.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
1. Valves: Manufacturer's standard.
2. Handles and Levers: Manufacturer's standard.
3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-2-A**: 5-lb (2.3-kg)**] nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

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

3.2 INSTALLATION

A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 104416

SECTION 123661 – SOLID SURFACE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY

A. Section Includes:

1. Solid-surface material countertops.
2. Quartz agglomerate countertops.

1.3 ACTION SUBMITTALS

A. Shop Drawings:

1. Shop drawings for fabrication and installation of each item or assembly. Include location drawings for each item or assembly, dimensioned elevations and plans and large scale details.
2. Show all finish and edge treatments, hardware, anchors (size and spacing), support attachment and framing locations, sinks, fittings and toilet accessories. Indicate adjacent and supporting construction for each item and fabrication.

B. For countertops. Show materials, finishes, edge and profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples for Verification: For the following products:

1. Countertop material, 6 inches (150 mm) square.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.5 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

A. Configuration: Provide countertops of thickness and configuration as indicated on the drawings:

B. Countertops: 1/2-inch- (12.7-mm-) or 3/4-inch- (19-mm-) thick, solid surface material with front edge built up with same material.

C. Backsplashes: 1/2-inch- (12.7-mm-) or 3/4-inch- (19-mm-) thick, solid surface material.

D. Fabrication: Fabricate tops in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.

2.2 QUARTZ AGGLOMERATE COUNTERTOPS

A. Configuration: Provide countertops of thickness configuration as indicated on the drawings:

B. Countertops: 3/4-inch- (20-mm-) thick, quartz agglomerate with front edge built up with same material.

C. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.3 COUNTERTOP MATERIALS

A. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue, made with binder containing no urea formaldehyde.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

C. Adhesives: Adhesives shall not contain urea formaldehyde.

1. Colors and Patterns: As indicated on the Drawings.

D. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

1. Type: Provide Standard Type unless Special Purpose Type is indicated.
2. Colors and Patterns: As indicated on the drawings.

E. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.

1. Colors and Patterns: As indicated on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

END OF SECTION 123661