

PROJECT MANUAL

Hilton Guestroom Conversion 19th Floor Hilton Americas Houston, Texas

Prepared by

Gensler

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Houston, Texas 77002

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Issue for Bid / Permit - December 1, 2017

Project Number 02.8339.000

Gensler
02.8339.000

December 1, 2017
Issue for Bid / Permit

Hilton Guestroom Conversion
19th Floor
Hilton Americas
Houston, Texas

ARCHITECT
Gensler
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Houston, Texas 77002
713.844.0000



Sealing Interior Designer's Name: Gerald C. Gehm
Texas License No.: 7922
Issue Date: December 1, 2017

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PART 1 - GENERAL

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
 - 1. "Exhibit 1" - Hotel Guestroom Conversion Agreement.
 - a. The General Conditions for Project are specified in Document 00 72 00.

1.2 ADMINISTRATIVE FORMS

- A. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; docspurchases@aia.org; (800) 942-7732.
- B. Pre-Construction Forms:
 - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
 - 2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
- C. Information and Modification Forms: Attached at the end of this Section.
 - 1. Submittal Transmittal.
 - 2. Data Transfer Agreement.
 - 3. Subcontractors and Major Material Suppliers List.
 - 4. Requests for Interpretation (RFI).
 - 5. Substitution Request.
 - 6. Bulletin.
 - 7. Change Order Form.
 - 8. Punch List.
 - 9. Certificate of Substantial Completion.
- D. Payment Forms:
 - 1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."
 - 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."
 - 3. Form of Contractor's Affidavit: AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."

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4. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit of Payment of Release of Liens."

PART 2 - NOT USED

PART 3 - NOT USED

END OF DOCUMENT 00 60 00



SUBMITTAL TRANSMITTAL

Project: _____ Date: _____
A/E Project Number: _____

TRANSMITTAL A To (Contractor): _____ Date: _____ Submittal No. _____
From (Subcontractor): _____ By: _____ [] Resubmission

Table with 4 columns: Qty., Reference / Number, Title / Description / Manufacturer, Spec. Section Title and Paragraph / Drawing Detail Reference

- Submitted for review and approval
Resubmitted for review and approval
Complies with contract requirements
Will be available to meet construction schedule
A/E review time included in construction schedule
Substitution involved - Substitution request attached
If substitution involved, submission includes point-by-point comparative data or preliminary details
Items included in submission will be ordered immediately upon receipt of approval

Other remarks on above submission: [] One copy retained by sender

TRANSMITTAL B To (A/E): _____ Attn: _____ Date Rec'd by Contractor: _____
From (Contractor): _____ By: _____ Date Trnsmt'd by Contractor: _____

- Approved
Approved as noted
Revise / Resubmit
Rejected / Resubmit

Other remarks on above submission: [] One copy retained by sender

TRANSMITTAL C To (Contractor): _____ Attn: _____ Date Rec'd by A/E: _____
From (A/E): _____ [] Other By: _____ Date Trnsmt'd by A/E: _____

- Approved
Approved as noted
Not subject to review
No action required
Revise / Resubmit
Rejected / Resubmit
Approved as noted / Resubmit
Provide file copy with corrections identified
Sepia copies only returned
Point-by-point comparative data required to complete approval process
Submission Incomplete / Resubmit

Other remarks on above submission: [] One copy retained by sender

TRANSMITTAL D To (Subcontractor): _____ Attn: _____ Date Rec'd by Contractor: _____
From (Contractor): _____ By: _____ Date Trnsmt'd by Contractor: _____

Copies: [] Owner [] Consultants [] _____ [] _____ [] _____ [] One copy retained by sender

Data Transfer Agreement

Entity Requesting Data ("Transferee")	Transferee Contact Name
Project	Project Number
Client	Date

File 1DTA This is page 1 of

Transferee has asked Gensler to provide electronic copies of, or access to, certain drawings, specifications, or other documents, CAD data files, and/or building information models (collectively, "Data") prepared by Gensler and/or its consultants (collectively "Gensler") for the Project. Gensler agrees to provide Transferee with the requested Data, under the terms of this Data Transfer Agreement ("Agreement").

1. The transfer of the Data is not and shall not be deemed a sale. The Data are instruments of service. Gensler shall be deemed the Data's author and shall retain all proprietary rights, including any copyrights, embodied therein.
2. Transferee may transfer the Data to its contractors, subcontractors, suppliers, and consultants (collectively "Others"), provided Transferee requires the Others to be bound by this Agreement as if they were the Transferee in this Agreement. Transferee and Others may use the Data only for purposes related to the Project.
3. Transferee acknowledges that anomalies and errors may occur when the Data is transferred electronically or used in an incompatible computer environment. Transferee solely accepts the risks associated with, and the responsibility for, any damages to hardware, software, computer systems, or networks related to the Data's transfer or use. Gensler shall have no responsibility to provide software or training to allow Transferee to use the Data.
4. Gensler shall have no duty to modify or update the Data. Gensler may retain an archival copy of the Data, which shall be conclusive proof and govern in any dispute over the Data's form or content.
5. Transferee agrees to indemnify, defend and hold Gensler, its officers, directors, shareholders, employees, agents, and consultants harmless from and against any and all claims, liabilities, suits, demands, losses, damages, costs, and expenses, including, but not limited to, reasonable attorneys' fees and all legal expenses and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms or any other legal entities on account of any damages or losses to property or persons, including, but not limited to, injuries, death or economic losses, arising out of Transferee's or Others' use, reuse, transfer, or modification of the Data, except where a court or forum of competent jurisdiction determines that Gensler is solely liable for such damages or losses.
6. If Transferee fails to perform or observe any of the terms of this Agreement, Gensler may demand, and Transferee immediately shall return, the Data and any copies thereof.
7. To the extent the Data include building information models ("Models"), the parties agree to the following additional terms: (i) The Models are intended for the purpose of communicating design intent. While they may be helpful to illustrate conflicts or inconsistencies in the design, the Models may not detect all conflicts or inconsistencies. (ii) Any use of the Models for the purpose of generating quantity take-offs or cost estimates, or for fabrication, will be at the Transferee's sole risk. (iii) As with Gensler's other services and deliverables, the Models will be prepared using that degree of skill and care exercised by licensed professionals practicing in the same community, under the same or similar circumstances. The Models may contain, or be based upon, data or information provided by others. Gensler has relied upon such data or information as is consistent with this standard of care. (iv) Information contained in the Models will not be construed to dictate construction means or methods, which will remain the contractor's responsibility. (v) To the extent of any conflict between information contained in, or generated by, the Models and Gensler's drawings and specifications, the latter documents will prevail.
8. This Agreement shall be governed by the law of the location of Gensler's office identified at the bottom of this Agreement.
9. In any legal proceeding to enforce this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs of defense.
10. Unless otherwise explicitly agreed to in writing by the parties, this Agreement shall govern any and all future data transfers to Transferee by Gensler.

Gensler Authorization by	Date Signed
_____ Input Principal or Managing Principal's name here	

Transferee Authorization by	Date Signed
------------------------------------	--------------------

711 Louisiana
Suite 300
Houston TX 77002
Tel: +1 713.844.0000
Fax: +1 713.844.0001



SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

Project: _____ From (Contractor): _____

Date: _____
To (A/E): _____ A/E Project Number: _____

Contract For: _____

List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

Section Number	Firm	Address	Section Title	Phone Number (Fax Number)	Contact
----------------	------	---------	---------------	---------------------------	---------

Attachments

Signed by: _____

Date: _____

Copies: Owner Consultants _____ _____ _____ File

Request for Interpretation

Gensler

Project	RFI Number
To	Date
Attention	Project Number
From	File 6RFI
Issued By	Drawing Sheet / Location
Subject	Detail
Distribution	Specifications Page Number
	This is page 1 of

Problem, Cause and Proposed Solution (attach sketches as necessary)

Effect on Schedule

Effect on Cost

Reply

Reply Needed by

Signature

Date

Substitution Request



Project	Date
Project Location	Project Number
General Contractor	File 6SR
Prepared by	This is page 1 of

We certify that the following product is equal or superior to the specified product in appearance, durability, performance, and in every other respect, and we hereby submit it for your consideration as a substitute for the specified item for the above-mentioned project:

- | | |
|--------------------------|----------------|
| 1. Specified Item | Section |
|--------------------------|----------------|
- 2. Proposed Substitution**
 - 3. Reason for Substitution**
 - 4. Costs** (Provide a complete breakdown of costs, including the cost amount to be DEDUCTED from the Contract Sum if the proposed substitution is accepted. Include documentation for both materials and labor.)
 - 5. Schedule** (Describe substitution's affect on construction schedule)
 - 6. Supporting Data**
 - **Cutsheets: Attach complete technical data, including laboratory tests, if applicable.**
 - **Installation: Include complete information on changes to Drawings and/or Specifications describing the steps that the proposed substitution will require for its proper installation.**
 - **Samples: Submit with request all necessary samples and substantiating data clearly marked to prove equal quality and performance to that which is specified.**
 - 7. List ways in which the substitution affects dimensions shown on Drawings**
 - 8. List affects of proposed substitution on other trades**
 - 9. List ways in which proposed substitution will be affected by applicable code requirements and agency approval**
 - 10. List differences between proposed substitution and specified item**
 - 11. Manufacturer's warranties of the proposed and specified items are:** **Same** **Different**
Explain:
 - 12. List information on availability of maintenance service and source of replacement materials**
 - 13. Certification of, and Assumption of Liability for, Equivalent Performance**

The undersigned certifies that the function, appearance and quality of the proposed substitution is equivalent or superior to the specified item and is in full compliance with the Contract Documents and applicable regulatory requirements.

Supplier	_____	Signature	_____
Telephone No.	_____	Date	_____

Signature must be by person authorized to legally bind his/her firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

General Contractor	_____	Signature	_____
Telephone No.	_____	Date	_____

Project _____ Date _____

Project Location _____ Architect's Project Number _____

Owner/Client _____ File 6BL This is page 1 of _____

To _____ Attention _____

Address _____

City _____ State _____ Zip Code _____

Delivered via: Messenger Hand carried Facsimile
 Express Pick-up E-mail Address
 Mail UPS Website Address

This Bulletin Conveys to Contractor (Check one of the following five choices.):

- Architect's Authorization for Minor Changes**
Architect recommends modifications to the Work as described below.
- Architect's Clarification / Supplemental Instructions** (Use this Bulletin form in place of *Architect's Supplemental Instructions* form.)
Contractor shall carry out the Work in accordance with the following supplemental instructions.
- Architect's Confirmation of a Field Order** (Use this Bulletin form in place of a *Field Order* form.)
This confirms Architect's verbal instructions to (individual's name) _____ on (date) _____, as described below.
Note: The above three choices are each subject to the following terms: The change(s), clarification(s) and/or confirmation(s) described below is/are issued in accordance with the Contract Documents, without change in Contract Sum and/or Time.
- Architect's Request for Contractor's Proposal** (Use this Bulletin form in place of an *Estimate Request* form.)
Please submit an itemized proposal for changes in the Contract Sum and/or Time for proposed modifications to the Contract Documents described herein. Submit proposal **within _____ days** or notify the Architect in writing of the date on which you anticipate submitting your proposal. This is not a Change Order or a Construction Change Directive or a direction to proceed with the Work described in the proposed modifications.
- Other:** As described below.

Attachments

Requested by
 Architect Owner Contractor Other (specify): _____

Issued by Gensler by _____ **Date Signed** _____

Issued by Owner by _____ **Date Signed** _____
 Required; Please return signed copy to Gensler Not Required

Accepted by Contractor by _____ **Date Signed** _____
 Required; Please return signed copy to Gensler Not Required

Distribution

Prepared by Gensler by _____ **Date Signed** _____

Instructions / Description / References / Dates

Begin text here...

Change Order Number

Project	Date
----------------	-------------

Project Location	Project Number
-------------------------	-----------------------

Owner / Client	File	6CO	This is page	1 of
-----------------------	-------------	-----	---------------------	------

Contractor	Contractor's Request / Quotation Number / Date
-------------------	---

Change to Contract Sum:	Choose One:	Change to Contract Time:
--------------------------------	-------------	---------------------------------

Original Contract Amount:	Choose One:	Revised Contract Amount:	Choose One:
----------------------------------	-------------	---------------------------------	-------------

See Change Order Summary for Revised Total Contract Amount and Time

Reason for Change	Requested by
--------------------------	---------------------

Recommended for Approval by Gensler: by	By Por	Date Signed
--	---------------	--------------------

Approved for Owner / Client	By	Date Signed
------------------------------------	-----------	--------------------

Approved for Contractor	By	Date Signed
--------------------------------	-----------	--------------------

Approved for Tenant (if applicable)	By	Date Signed
--	-----------	--------------------

The above Change Order to the contract shall be effective upon signature by all applicable parties, in accordance with the Conditions of the Contract. The Contract Amount refers to the Contract Sum or guaranteed Maximum Cost in the Contract.

Distribution

Description / References / Costs / Dates

Begin text here . . .

Punch List

Project	Date of Observation	
Project Location	Project Number	
List Number	File	6PL
	This is page	1 of

Present

Field review by Gensler disclosed the item(s) listed below, which is/are not in accordance with the Contract Documents. Contractor shall, upon receipt of this list, and before Gensler issues the Certificate of Substantial Completion, proceed promptly to complete and correct the item(s) and shall then submit a request for another field review by Gensler to determine Substantial Completion. This list supplements Contractor's Punch List and, unless otherwise noted, supersedes Gensler's previous list(s). Gensler will rely on this list as the approved record of matters discussed and conclusions reached, unless Contractor's written notice to the contrary is received by Gensler within seven calendar days of the date this list was issued.

Distribution

Prepared by	Date Issued
--------------------	--------------------

Space / Item Number / Descriptions / Observations

Certificate of Substantial Completion



Project	Project Number	
Project Location	Date Issued	
Owner / Client	File	6SC
Contract Date	This is Page	1 of

Date of Substantial Completion

Date of Substantial Completion is applicable to	<input type="checkbox"/> Entire Project	<input type="checkbox"/> Designated Portion of Project, as described below
Punch List	<input type="checkbox"/> Attached	<input type="checkbox"/> Transmitted Separately <input type="checkbox"/> None

The Work performed under the Contract for Construction has been reviewed and found, to Architect's best knowledge, information and belief, to be substantially complete as of the Date of Substantial Completion entered above. The Date of Substantial Completion is the date when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents (including any approved change Orders) and all required final inspections and permits have been obtained so Owner can occupy or utilize the Work for its intended use, subject only to completion of minor items (Punch List).

The Work, or designated portion thereof shall include:

A list of items to be completed or corrected and the date(s) when such items are to be completed (Punch List) may be attached hereto or transmitted separately. This Certificate of Substantial Completion or omission of any item from the Punch List shall not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The Architect shall not be responsible for any omission from, or other discrepancy on, the Punch List. Contractor agrees to complete or correct the items listed on the Punch List within _____ days of the above date of Substantial Completion.

Warranties required under the Contract Documents shall commence on the Date of Substantial Completion, except for Punch List items and other incomplete work, warranties for which shall commence on the date such work is satisfactorily completed, unless otherwise agreed in writing by Owner and Contractor.

The Owner and Contractor shall fulfill and transfer responsibilities with regard to insurance, utilities, maintenance, damage, security, surety, and the like, in accordance with the Contract Documents or other written agreement between them.

The Architect has conducted no tests for, and made no determination of the presence or lack of asbestos or other hazardous or toxic substances or pollutants.

The Basic Services of the Architect shall end 30 days after the Date of Substantial Completion, unless otherwise stated in the Owner/Architect Agreement or agreed in writing.

Begin text here . . .

Architect	Gensler	By	Date Signed
Owner / Client		By	Date Signed
Contractor		By	Date Signed

711 Louisiana
Suite 300
Houston TX 77002
Tel: +1 713.844.0000
Fax: +1 713.844.0001

DOCUMENT 00 72 00 - GENERAL CONDITIONS

PART 1 - GENERAL

- A. Exhibit "A" - Terms and Conditions, hereinafter referred to as General Conditions, are hereby made a part of the Contract Documents.
- B. The Contractor is hereby specifically directed, as a condition of the Contract, to become acquainted with the Articles contained therein, and to notify and apprise all Subcontractors and other parties to the Contract of, and bind them to, its conditions.
- C. No contractual adjustments shall be due as a result of failure on the part of the Contractor, Subcontractors or other parties to the Contract to be fully acquainted with the General Conditions.
- D. The provisions of the General Conditions, when included, and Division 01 "General Requirements," apply to the Work specified in each Section of the Specifications.
- E. Where conflicts occur concerning the Architect's duties and responsibilities between the General Conditions and the Agreement between the Owner and Architect, the Agreement shall take precedence.
- F. If not otherwise included in the Owner-Contractor Agreement or specifically included in the bidding documents, the Contractor shall obtain the Owner's insurance requirements prior to submitting a bid.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 00 72 00

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work covered by Contract Documents.
2. Work under separate contracts.
3. Owner-furnished products.
4. Miscellaneous provisions.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to all Sections. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

1. In the event of a conflict among the Contract Documents, immediately notify the Architect for resolution.
2. Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:
 - a. Amendments and revisions (such as Change Orders and Bulletins) of later date take precedence over those of earlier date;
 - b. The Agreement;
 - c. Addenda of later date take precedence over those of earlier date;
 - d. The Supplementary Conditions;
 - e. The General Conditions;
 - f. Drawings and Specifications: Drawings govern Specifications for quantity and location. Specifications govern Drawings for quality and performance. In the event of ambiguity or conflicts, the greater quantity and the better quality shall govern.

1.2 PROJECT INFORMATION

1. Project Identification: Hilton Americas - Guestroom Conversion 19th Floor, Houston, Texas.
2. Project Location: 1600 Lamar Street, 19th Floor
Houston, Texas 77010
3. Owner: Houston First Corporation
701 Avenida de las Americas, Suite 200
Houston, Texas 77010

- 4. Architect: Gensler
711 Louisiana Street, Suite 300
Houston, TX 77002
- 5. MEP Consultants: Hunt and Hunt Engineering Corp.
P.O.Box 771294
Houston, TX 77215

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Selective demolition of existing construction as indicated on Drawings.
 - 2. Construction of interior tenant facilities within an existing building.
- B. Type of Contract: Project will be constructed under a single prime contract.

1.4 WORK UNDER SEPARATE CONTRACTS

- A. General: Owner will award separate contracts for performance of certain construction activities at the Project site. The activities may occur prior to commencement of Work under this Contract, concurrent with the Work under this Contract, or as future work.
 - 1. 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.
 - 2. Coordinate the Work of this Contract with work performed under separate contracts.
 - 3. Advise Owner of installation schedules and critical dates when Contractor's work is dependent on the installation of Work by others.

1.5 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.
- B. Owner-Furnished Products: As indicated in a schedule on the Drawings.

1.6 MISCELLANEOUS PROVISIONS

- A. Special Insurance: Contractor's Commercial General Liability insurance shall contain no exclusion that would deny coverage for any claim arising out of or contributed to by any fungus, mildew, mold, or resulting allergens. If such exclusion exists and cannot be removed by endorsement, Contractor shall submit proof of coverage for fungus, mildew, mold, or resulting allergens under a Pollution Legal Liability or Contractor's Pollution Liability policy.

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Hilton Americas
Houston, Texas

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 14 00 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Existing utility interruptions.
2. Use of premises.
3. Occupancy requirements during construction.
4. Occupancy requirements prior to Substantial Completion.
5. Miscellaneous restrictions.

1.2 EXISTING UTILITY INTERRUPTIONS

A. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

1.3 USE OF PREMISES

A. Access: At all times, provide the Architect and the Owner's representatives, easy and safe access to the Work wherever it is in preparation and progress. Provide such access so Architect may perform its functions. Provide access to any testing agencies to perform required testing.

1. Coordination with Owner's Separate Contractors: Provide access for Owner's separate contractors listed in Section 01 10 00 "Summary" and coordinate schedule for the installation of their work.

B. Use of Site: Confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents. Do not unreasonably encumber the Site with any materials or equipment. Coordinate loading on floor or roof with Architect and/or Structural Engineer to assure that no surfaces exceed carrying capacity.

1. Coordinate with Owner for secured storage within the building, if applicable.
2. Protect and maintain common areas of the building that are in the path of travel for construction personnel and used for transporting materials and equipment to and from the construction site.

- C. On-Site Work Hours: Limit work in the existing building to normal business working hours, Monday through Friday, unless otherwise indicated.
1. Hours for Noise-Generating, Odor-Generating, and Dust-Generating Activities and Demolition: After business hours, or at such times as approved by the Owner.
 - a. Noise- and Odor-Generating activities include, but are not limited to, sprinkler work, concrete saw cutting, core drilling, spray painting, hammering, nailing, and similar work, which may cause noise, dust, or odors, thereby disturbing occupants.
- D. Building Manager's Rules: Conform at all times to the Landlord's and Property Manager's requirements for protection of plant, materials, equipment, and noise levels.
- E. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
1. Schedule deliveries to minimize use of driveways and entrances.
 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 3. Do not block entrances, fire exits or lanes, or delivery routes.
 4. Limit use of driveways and entrances to the following times:
 - a. Monday through Friday: 9 AM to 4 PM.
 - b. After Hours (When Approved by Owner : 7 PM to 10 PM, and anytime on Saturday.
- F. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. Hours and/or elevator(s) may be restricted for material deliveries.
1. Do not load elevators beyond their rated weight capacity.
 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- G. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- H. Loading Dock Usage: Use loading dock for delivery of material to work areas and for the disposal of rubbish and waste materials. Maintain loading dock in a clean condition acceptable to Owner.

1. Schedule use of loading dock with Owner and Tenants to avoid disruption of building occupants' operations.
2. Do not store materials on loading dock.

1.4 OCCUPANCY REQUIREMENTS DURING CONSTRUCTION

- A. Full Owner Occupancy: Owner will occupy the site during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.
1. Schedule use of premises for Work and coordinate construction operations with the Owner to allow for Owner occupancy.
 2. Schedule use of premises for Work and coordinate construction operations with the Owner to allow for use of site and premises by the public.
 3. Keep premises orderly, clean and with a minimum of obstruction and inconvenience to the tenants and the public.
 4. Relocate any stored products that interfere with public access, operations of the Owner or separate contractor. If necessary, obtain and pay for additional storage or work areas needed for operations.
 5. Limit use of premises to areas designated unless otherwise allowed in writing by the Owner.
 6. Maintain all required exits at all times. Do not locate any materials in exit pathways.

1.5 OCCUPANCY REQUIREMENTS PRIOR TO SUBSTANTIAL COMPLETION

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of the site, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of incomplete portions of the Work, nor shall it relieve the Contractor of its responsibility for completion of the Work in accordance with the Contract Documents.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of the Work.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of the Work.

1.6 MISCELLANEOUS RESTRICTIONS

- A. Noise, Dust, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to occupancy.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
 - 3. Radios and music are not permitted.
 - 4. On-site paging systems are not permitted.
- B. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.
- D. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- E. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of "Substitution Request" form provided in Document 00 60 00 "Forms."
 - 2. Documentation: Submit complete Substitution Request Form and the following, as applicable:
 - a. Certificates and qualification data, where applicable or requested.
 - b. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - c. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - d. Research reports evidencing compliance with building code in effect for Project, from ICC-ES and local regulations.
 - e. 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.
 - f. Contractor's assurance that proposed substitution will not cause schedule or coordination problems with adjacent materials and systems.

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

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce required results.
 - b. Requested substitution provides the same sustainable design characteristics that specified product provided[**for achieving LEED prerequisites and credits**].
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.

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

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

- A. Architect may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on "Bulletin" form included in Document 00 60 00 "Forms."

1.3 WORK CHANGE PROPOSAL REQUESTS

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

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on form included in Document 00 60 00 "Forms."

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 26 13 - REQUESTS FOR INTERPRETATION (RFI)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Requests for Interpretation.

1.3 DEFINITIONS

- A. Requests for Interpretation (RFI): Contractor initiated written instrument related to the execution of the Work that is addressed to the Architect. The RFI shall be used by the Contractor as the means to ask questions related to the Work; subject to the conditions contained within this Section.

1.4 ACTION SUBMITTALS

- A. Requests for Interpretation: Include a detailed, legible description of an item needing information or interpretation and the following:
 - 1. Project name.
 - 2. Project number.
 - 3. Date.
 - 4. Name of Contractor.
 - 5. Name of Architect.
 - 6. RFI number, numbered sequentially.
 - 7. RFI subject.
 - 8. Reference to appropriate documents:
 - a. Specification Section number and title and related paragraphs.
 - b. Drawing number and detail references.
 - c. Schedule.
 - d. Bulletin number.
 - e. Other Contract Documents, if any.
 - 9. Field dimensions and conditions, as appropriate.

10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Contractor's and RFI Manager's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

- B. RFI Forms: Use "Request for Interpretation" form bound in Document 00 60 00 "Forms."

1.5 INFORMATIONAL SUBMITTALS

- A. RFI Log: Prepare, maintain, and submit a tabular log of RFI organized by the RFI number. Submit log weekly. Include the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.

1.6 QUALITY ASSURANCE

- A. Authorship: Prior to the commencement of the RFI process, designate a full time "RFI Manager" whose duties shall include the responsibility for enforcing the Request for Interpretation provisions of this Section, to maintain an up-to-date log of all RFI, advise the Architect, in writing, of the status and disposition of all RFI at the progress meetings, and be a member of the Contractor's staff. The RFI Manager shall be experienced in administration and supervision of the type of Work indicated on the Contract Documents.
 1. RFI Manager may be the Contractor's Job Superintendent.
 2. Each RFI shall originate solely from the RFI Manager. An RFI submitted to the Architect by an entity, or individual, other than the RFI Manager shall be returned to the Contractor.

1.7 ADMINISTRATIVE REQUIREMENTS

- A. Processing Time: Allow five working days for Architect's response for each RFI. RFI received by Architect after 3:00 p.m. will be considered as received the following business day.
 1. Allow additional time if coordination with other work is required. Architect will advise Contractor when a RFI being processed must be delayed for coordination.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
- B. Architect's action on RFI that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Request according to Section 01 26 00 "Contract Modification Procedures."
1. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- C. Frivolous RFI:
1. RFI shall not be used for the following:
 - a. Request for approval of submittals.
 - b. Request approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Request for adjustment in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Requests for coordination information already indicated in the Contract Documents, or to transfer coordination responsibility from the Contractor to the Owner or Architect.
 - g. Incomplete RFI or inaccurately prepared RFI.
 2. The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of a RFI response performed by the Architect, and any of its consultants, which is deemed by the Owner and the Architect as being frivolous or unnecessary.
 3. Frivolous RFI shall be removed from the RFI log.

1.8 COORDINATION

- A. Coordination: Coordinate preparation and processing of RFI with performance of construction activities.
1. Submit RFI with such promptness as to cause no delays in the Work. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S ACTION

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.
- B. Prior to submission of the RFI, coordinate the nature of the inquiry with the requirements of other Sections or trades as related thereto and responses to previous RFI.
- C. Complete each blank on the RFI form.
- D. In preparing each RFI, verify the applicable dimension(s), field conditions, Drawing requirements (small through large scale details), and/or Specification Section requirements pertaining thereto.
- E. Each RFI shall be reviewed, and signed by the RFI Manager prior to transmitting to the Architect .
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

3.2 ARCHITECT'S ACTION

- A. Architect's Action: Architect will review each RFI, determine action required, and respond.
 - 1. Frivolous RFI will be returned without action.
- B. RFI which fail to conform to requirements, (for example, is incomplete or contain numerous errors) shall be returned to the Contractor without a response. No adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to requirements.

END OF SECTION 01 26 13

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 01 32 00 "Construction Progress Documentation" for construction schedule.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. 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.
 - a. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - b. Break down principal subcontract amounts into separate labor and materials items. Breakdown of subcontractor's schedule of values must be true and accurate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance. No items will be permitted to be stored offsite without prior approval by Architect and Owner.
6. 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.
7. Include separate line items under principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the schedule of values before each Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Architect by the first day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned to Contractor without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment by a method ensuring receipt within 24 hours of preparation. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit notarized waivers of mechanic's lien from every entity lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors, principal suppliers, and fabricators.
 2. Contractor's construction schedule (preliminary if not final).
 3. Schedule of values.
 4. Submittal schedule (preliminary if not final).
 5. List of Contractor's staff assignments.
 6. List of Contractor's principal consultants.
 7. Copies of building permits.
 8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

9. Report of preconstruction conference.
 10. Certificates of insurance and insurance policies.
 11. Performance and payment bonds.
 12. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements, including, but not limited to the following:
 - a. Transmittal of required Project Record Documents to Owner.
 - b. Evidence of completion of demonstration and training.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.
 10. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.

1.4 REVIEW OF APPLICATION FOR PAYMENT

- A. Draft Copy Review Meeting: The Owner, Architect, Project Manager, and Contractor shall meet prior to payment application due date to review the draft (pencil) copy of the Application for Payment. Questions resulting from this review shall be answered by the Contractor and clarified prior to receipt of the official copy of the Application for Payment.
- B. Upon receipt of the official Application for Payment and other documentation as required by the Architect including the updated Schedule of Values and the updated Contractor's Construction Schedule if required, the Architect shall review the documents received to

determine if they correspond to the agreements reached during the draft copy review meeting. If necessary, the Architect shall revise the Application for Payment to correspond to the agreements reached, execute the Certificate for Payment, and forward the executed copies to the Owner.

- C. The Architect will rely on the accuracy and completeness of the information furnished by the Contractor. Issuance of a Certificate of Payment will not be deemed to represent that the Architect performed audits of the supporting data.
- D. Payment will not be made for materials and equipment stored off site, except at the Owner's discretion and prior approval. When the Application for Payment includes material or equipment stored off site, include with the Application a written statement on Contractor's letterhead certifying the following:
 - 1. Description of the item(s) being stored.
 - 2. Location of the bonded warehouse(s) where materials or equipment is being stored.
 - 3. Affidavit of storage.
 - 4. Certificate of insurance.
 - 5. Bill of sale made to Owner stating there will be no additional cost for transportation and delivery of the item(s) being stored.
 - 6. Statement certifying that item, or any part thereof, will not be installed in any construction other than work under this Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Coordination drawings.
 - 3. Project meetings.

1.2 INFORMATIONAL SUBMITTALS

- A. Coordination drawings.
- B. Meeting minutes.

1.3 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Arrange pipes, ducts, conduits, and other overhead systems in an orderly manner when indicated to remain exposed.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work.

1.4 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop

Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Contract Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

- B. Coordination Drawing Organization: Organize coordination drawings as follows:
 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

1.5 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Entity responsible for conducting meeting will prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Pre-Construction Conference: Schedule and conduct a pre-construction conference before starting construction, at a time convenient to Owner and Architect.
- C. Pre-Installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
 1. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at regular intervals that reflects the stage of the work

1. Coordinate dates of meetings with preparation of payment requests.
2. Schedule Updating: Comply with requirements in Section 01 32 00 "Construction Progress Documentation."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Daily construction reports.

1.2 DEFINITIONS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit updated schedule with each Application for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.

1.4 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early or late completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story and separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 5 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 10 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Work under More Than One Contract: Include a separate activity for each contract.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Work Restrictions: Show the effect of the following items on the schedule:

- a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Environmental control.
6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
- a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Deliveries.
 - g. Installation.
 - h. Tests and inspections.
 - i. Adjusting.
 - j. Startup and placement into final use and operation.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- E. Recovery Schedule: When periodic update indicates the Work is seven or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules. Coordinate with Architect regarding which project management software will be used on the Project.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within seven days of date established for the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including rain or snow accumulation.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Tests and inspections, including name(s) of testing and inspection agency(ies).
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Construction Change Directives received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial Completions and occupancies.
 20. Substantial Completions authorized.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At regular intervals, update schedule to reflect actual construction progress and activities. Issue schedule with draft review of each Application for Payment.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
 4. Notify Owner and Architect one week prior to revising the Project schedule.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

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

END OF SECTION 01 32 00

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting photographic documentation.
 - 2. Section 02 41 19 "Selective Structure Demolition" for photographic documentation before selective demolition operations commence.

1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Digital Camera: Minimum sensor resolution of 10 megapixels.
 - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
 - 3. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Unique sequential identifier keyed to accompanying key plan.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 10 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.
 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Flag construction limits before taking construction photographs.
 2. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
 3. Take a minimum of 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take a minimum of 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. FTP: File Transfer Protocol
 - 1. Architect's FTP internet address will be provided to the Contractor upon notice to proceed.
- D. PDF: Portable Document Format licensed by Adobe Systems.

1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 3. Format: Arrange the following information in a tabular format:

- a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category (Action, informational, closeout).
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled date of fabrication.
4. Architect reserves the right to withhold 10 percent of each payment request, in addition to retainage fee if any, until the submittal schedule is received and accepted by the Architect.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of digital data Drawings of the Contract Drawings will be furnished by Architect for Contractor's use in preparing Shop Drawings and Project record drawings.
1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 2. Execute and submit the Data Transfer Agreement form included in Document 00 60 00 "Project Forms." Do not distribute digital data drawing files prior to transmitting to Architect copies of Data Transfer Agreement signed by each entity requesting the files.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. Architect will document on submittal the date of receipt. Submittals received by Architect after 1:00 p.m. will be considered as received the following working day. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will

advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.

2. Resubmittal Review: Allow 10 days for review of each resubmittal.
3. Sequential Review: Sequential review is a submittal that requires review by more than one design discipline. Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 - a. Unique identifier, including revision number. Submittals shall be numbered with the Section number, followed by a dash, followed by a three-digit number, followed by a dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.
 - 1) Section Number: Section number where submittal is specified.
 - 2) Three-Digit Number: Sequential number, beginning with "001," for each submittal transmitted to Architect for each Section.
 - 3) Submission Number: Use "0" for initial submittal, "1" for first resubmittal, "2" for second resubmittal, and so forth.
 - 4) Example: 061000-001-0 (Section 06 10 00, first submission of the Section, initial submittal).
2. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
3. Scanned Copies: Legible scanned PDF files of paper originals are acceptable. Scanned submittals that are not legible will be rejected.
4. Sheet Orientation: Orient PDF sheets to a "Ready-to-Read" orientation with majority of text horizontal to the sheet with no additional adjustments or formatting required by the viewer.
5. File Security: Do not set any permissions on the file. Protected documents will not be accepted.
6. Transmittal Form for Electronic Submittals: Use PDF of completed Submittal Transmittal form in Document 00 60 00 "Forms."
7. Metadata: Include the following information in the electronic submittal file metadata:
 - a. Title: Project title
 - b. Author: Contractor's name.
 - c. Subject: Submittal type (product data, shop drawing, report, etc.)
 - d. Keywords: Number and title of appropriate Specification Section; manufacturer name; product name/model number.
8. File Size: Limit file size of each submittal as follows. Break larger PDF files into multiple packages where necessary to meet delivery restrictions. Identify split packages as "1 of #" and "2 of #" in the subject line.

- a. Email Delivery: 2 Megabytes.
 - b. FTP Delivery: 100 Megabytes.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate document, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are stamped with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
 - 4. Costs of compensation for Architect's additional services and expenses made necessary for review of submittals exceeding the limits set forth below shall be at the Contractor's expense.
 - a. Reviews of Each Submittal: Two, including initial review.
- H. 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.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."
- J. The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by Architect and returned to Contractor with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Architect's FTP site specifically established for Project. Do not post zipped files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 3. Systems Submittals: Identify submittals for systems such as fire alarms and fire protection systems, on the transmittal and act upon the system singularly as a combined submittal. If resubmission is required, resubmit entire system submittal.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's written recommendations.
 - c. Manufacturer's product specifications.
 - d. Manufacturer's installation instructions.
 - e. Standard color charts.
 - f. Standard product operating and maintenance manuals.
 - g. Compliance with recognized trade association standards.
 - h. Compliance with recognized testing agency standards.
 - i. Application of testing agency labels and seals.
 - j. Notation of coordination requirements.
 - k. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.

- C. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not reproduce, digitally or otherwise, the Contract Documents and submit as Shop Drawings. Do not use, copy or reproduce title blocks, dimensions, notes, keynotes, symbols schedules or details from Contract Drawings, digital or otherwise. Use of the Contract Drawings shall be limited to reproduction, digitally or otherwise, of the exterior wall layout, interior partition layout, grid lines, doors, and windows. Do not base Shop Drawings on standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Fabrication and installation drawings.
 - c. Roughing-in and setting diagrams.
 - d. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
 - e. Shopwork manufacturing instructions.
 - f. Templates and patterns.
 - g. Schedules.
 - h. Design calculations.
 - i. Compliance with specified standards.
 - j. Notation of coordination requirements.
 - k. Notation of dimensions established by field measurement.
 - l. Relationship and attachment to adjoining construction clearly indicated.
 - m. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than size of Contract Drawings.
 3. BIM File Incorporation: Develop and incorporate Shop Drawing files into Building Information Model established for Project.
 - a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
 - b. Refer to Section 01 31 00 "Project Management and Coordination" for requirements for coordination drawings.
- D. Samples: Submit physical units of materials or products for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 3. Identification: Attach label on unexposed side of Samples that includes the following:

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

8. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
- E. Additional Submittals: Comply with requirements in other Division 01 Sections.
- F. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- J. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- L. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, coordinated, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S [AND CONSTRUCTION MANAGER'S] ACTION

- A. General: Architect will not review submittals that have not been properly transmitted, reviewed by Contractor, or do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review submittal make marks to indicate corrections or revisions required, and return it to Contractor. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
 - 1. "NO EXCEPTIONS TAKEN": No further review of Submittal required.

2. "MAKE CORRECTIONS AS NOTED. Resubmittal not required unless Contractor cannot comply with corrections noted.": Incorporate corrections in Work. If Contractor cannot comply with corrections as noted, revise to respond to exceptions and resubmit.
 3. "REVISE AS NOTED AND RESUBMIT": Revise as noted and resubmit for further review.
 4. "RESUBMIT PROPERLY Submittal not reviewed for reasons noted."
 5. "NOT REVIEWED Submittal not required by Contract Documents.": Remove from submittal log.
 6. "RECEIVED FOR CLIENT'S RECORD ONLY. Submittal not reviewed."
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents will not be reviewed and may be discarded or returned to the Contractor without action.
- G. Substitution items received as product data, shop drawing, or sample submittals required by individual Sections will be returned to Contractor without review. Comply with requirements in Section 01 25 00 "Substitution Procedures" for submission of substitution request.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site, unless indicated otherwise. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- I. Professional Engineer: Engineer currently licensed to practice in the State of Texas.

1.3 CONFLICTING REQUIREMENTS

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

1.4 INFORMATIONAL SUBMITTALS

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

- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- D. Testing Agency and Inspection Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- E. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.

- F. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- G. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Fabricator Qualifications:** A firm experienced and expert in producing products similar to those indicated for this Project and with a three-year record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a three-year record of successful in-service performance.
- E. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a five-year record of successful in-service performance.
- F. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. **Professional Engineer Qualifications:** A professional engineer who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

- H. Testing Agency Qualifications: An NRTL, an NVLAP-accredited, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities..
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish specified in individual Sections, to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Provide quality assurance and control services required due to changes in the Work proposed by or made by the Contractor.
 8. Provide quality control services for Work done contrary to the Contract Documents, without prior notice, when so specified, or without proper supervision.
 9. Overtime expenses and schedule delays accruing as a result of executing quality control services shall be the Contractor's responsibility and shall not be charged to the Owner.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents. Architect retains the right to require the use of a different testing agency for retesting and reinspecting.
- F. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
 7. Attend Project progress meetings as requested by Architect.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies or arranging for pick-up of test samples after normal business hours.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit schedule concurrently with Contractor's Construction Schedule as specified in Section 01 32 00 "Construction Progress Documentation."
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.7 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.

4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- B. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- C. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- D. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- E. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- F. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- G. "Provide": Furnish and install, complete and ready for the intended use.
- H. "As Required": As required by regulatory bodies, by referenced standards, by existing conditions, by generally accepted construction practice or by the Contract Documents. In the event of ambiguity or conflicts, the most stringent requirements shall apply.
- I. "By Others" refers to work that is not a part of the Contract.
- J. "N.I.C.": "Not in Contract" means the work or the item indicated is not a part of the Contract and will be provided by the Owner.
- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.

1.2 STANDARDS, REGULATIONS AND CODES

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.
- D. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. AA; Aluminum Association (The); www.aluminum.org.
 2. AAADM; American Association of Automatic Door Manufacturers; www.aaadm.com.
 3. AABC; Associated Air Balance Council; www.aabc.com.
 4. AAMA; American Architectural Manufacturers Association; www.aamanet.org.
 5. AASHTO; American Association of State Highway and Transportation Officials; www.transportation.org.
 6. AATCC; American Association of Textile Chemists and Colorists; www.aatcc.org.
 7. ABMA; American Bearing Manufacturers Association; www.americanbearings.org.
 8. ACI; American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 9. ADC; Air Diffusion Council; www.flexibleduct.org.
 10. AEIC; Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 11. AF&PA; American Forest & Paper Association; www.afandpa.org.
 12. AGA; American Gas Association; www.aga.org.
 13. AGC; Associated General Contractors of America (The); www.agc.org.
 14. AHA; American Hardboard Association; <http://domensino.com/AHA>.
 15. AHAM; Association of Home Appliance Manufacturers; www.aham.org.
 16. AHRI; Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 17. AIA; American Institute of Architects (The); www.aia.org.
 18. AISC; American Institute of Steel Construction; www.aisc.org.
 19. AISI; American Iron and Steel Institute; www.steel.org.
 20. AITC; American Institute of Timber Construction; www.aitc-glulam.org.
 21. ALSC; American Lumber Standard Committee, Incorporated; www.alsc.org.
 22. AMCA; Air Movement and Control Association International, Inc.; www.amca.org.
 23. ANSI; American National Standards Institute; www.ansi.org.
 24. APA; The Engineered Wood Association; www.apawood.org.
 25. APA; Architectural Precast Association; www.archprecast.org.
 26. APWA; American Public Works Association; www.apwa.net.

27. ARI; Air-Conditioning & Refrigeration Institute; (See AHRI).
28. ARI; American Refrigeration Institute; (See AHRI).
29. ASA; Acoustical Society of America; www.acousticalsociety.org.
30. ASC; Adhesive and Sealant Council (The); www.ascouncil.org.
31. ASCA; Architectural Spray Coaters Association.
32. ASHRAE; American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
33. ASME; ASME International; (American Society of Mechanical Engineers); www.asme.org.
34. ASPE; American Society of Plumbing Engineers; www.aspe.org.
35. ASSE; American Society of Safety Engineers (The); www.asse.org.
36. ASSE; American Society of Sanitary Engineering; www.asse-plumbing.org.
37. ASTM; ASTM International; (American Society for Testing and Materials International); www.astm.org.
38. ATIS; Alliance for Telecommunications Industry Solutions; www.atis.org.
39. ASCI; Association of the Wall and Ceiling Industry; www.awci.org.
40. AWI; Architectural Woodwork Institute; www.awinet.org.
41. AWMAC; Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
42. AWWA; American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
43. AWS; American Welding Society; www.aws.org.
44. AWWA; American Water Works Association; www.awwa.org.
45. BHMA; Builders Hardware Manufacturers Association; www.buildershardware.com.
46. BIA; Brick Industry Association (The); www.gobrick.com.
47. BICSI; BICSI, Inc.; www.bicsi.org.
48. BIFMA; BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
49. BISSC; Baking Industry Sanitation Standards Committee; www.bissc.org.
50. CCC; Carpet Cushion Council; www.carpetcushion.org.
51. CCFSS; Center for Cold-formed Steel Structures; www.ccfsonline.org.
52. CDA; Copper Development Association; www.copper.org.
53. CEA; Canadian Electricity Association; www.electricity.ca.
54. CEA; Consumer Electronics Association; www.ce.org.
55. CFFA; Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
56. CFI; International Certified Floorcovering Installers Association; www.cfi-installers.org.
57. CFSEI; Cold-Formed Steel Engineers Institute; www.cfsei.org.
58. CIMA; Cellulose Insulation Manufacturers Association; www.cellulose.org.
59. CISCA; Ceilings & Interior Systems Construction Association; www.cisca.org.
60. CISPI; Cast Iron Soil Pipe Institute; www.cispi.org.
61. CPA; Composite Panel Association; www.pbmdf.com.
62. CRI; Carpet and Rug Institute (The); www.carpet-rug.org.
63. CRSI; Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA; Canadian Standards Association; www.csa.ca.
65. CSA; CSA International; (Formerly: IAS; International Approval Services); www.csa-international.org.
66. CSI; Construction Specifications Institute (The); www.csinet.org.
67. CTI; Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.

68. CWC; Composite Wood Council; (See CPA).
69. DASMA; Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI; Door and Hardware Institute; www.dhi.org.
71. ECA; Electronic Components Association; (See ECIA).
72. ECAMA; Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA; Electronic Components Industry Association; www.eciaonline.org
74. EIA; Electronic Industries Alliance; (See TIA).
75. EIMA; EIFS Industry Members Association; www.eima.com.
76. EJMA; Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD; ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA; Entertainment Services and Technology Association; (See PLASA).
79. EVO; Efficiency Valuation Organization; www.evo-world.org.
80. FM Approvals; FM Approvals LLC; www.fmglobal.com.
81. FM Global; FM Global; (Formerly: FMG; FM Global); www.fmglobal.com.
82. FRSA; Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
83. FSA; Fluid Sealing Association; www.fluidsealing.com.
84. FSC; Forest Stewardship Council U.S.; www.fscus.org.
85. GA; Gypsum Association; www.gypsum.org.
86. GANA; Glass Association of North America; www.glasswebsite.com.
87. GBCI; Green Building Certification Institute; www.gbci.org.
88. GS; Green Seal; www.greenseal.org.
89. GTA; Glass Tempering Division of Glass Association of North America; (see GANA).
90. HI; Hydraulic Institute; www.pumps.org.
91. HI/GAMA; Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
92. HMMA; Hollow Metal Manufacturers Association; (See NAAMM).
93. HPVA; Hardwood Plywood & Veneer Association; www.hpva.org.
94. HPW; H. P. White Laboratory, Inc.; www.hpwhite.com.
95. IAPSC; International Association of Professional Security Consultants; www.iapsc.org.
96. IAS; International Accreditation Service; www.iasonline.org.
97. IAS; International Approval Services; (See CSA).
98. ICBO; International Conference of Building Officials; (See ICC).
99. ICC; International Code Council; www.iccsafe.org.
100. ICEA; Insulated Cable Engineers Association, Inc.; www.icea.net.
101. ICPA; International Cast Polymer Alliance; www.icpa-hq.org.
102. ICRI; International Concrete Repair Institute, Inc.; www.icri.org.
103. IEC; International Electrotechnical Commission; www.iec.ch.
104. IEEE; Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
105. IES; Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
106. IESNA; Illuminating Engineering Society of North America; (See IES).
107. IEST; Institute of Environmental Sciences and Technology; www.iest.org.
108. IGCC; Insulating Glass Certification Council; www.igcc.org.
109. IGMMA; Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. ILI; Indiana Limestone Institute of America, Inc.; www.iliai.com.
111. Intertek; Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.

112. ISA; International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
113. ISAS; Instrumentation, Systems, and Automation Society (The); (See ISA).
114. ISFA; International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
115. ISO; International Organization for Standardization; www.iso.org.
116. ISSFA; International Solid Surface Fabricators Association; (See ISFA).
117. ITU; International Telecommunication Union; www.itu.int/home.
118. KCMA; Kitchen Cabinet Manufacturers Association; www.kcma.org.
119. LMA; Laminating Materials Association; (See CPA).
120. MCA; Metal Construction Association; www.metalconstruction.org.
121. MFMA; Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA; Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA; Material Handling Industry of America; www.mhia.org.
124. MIA; Marble Institute of America; www.marble-institute.com.
125. MIA; Masonry Institute of America; www.masonryinstitute.org.
126. MMPA; Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
127. MPI; Master Painters Institute; www.paintinfo.com.
128. MSS; Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
129. NAAMM; National Association of Architectural Metal Manufacturers; www.naamm.org.
130. NACE; NACE International; (National Association of Corrosion Engineers International); www.nace.org.
131. NADCA; National Air Duct Cleaners Association; www.nadca.com.
132. NAIMA; North American Insulation Manufacturers Association; www.naima.org.
133. NBGQA; National Building Granite Quarries Association, Inc.; www.nbgqa.com.
134. NCMA; National Concrete Masonry Association; www.ncma.org.
135. NCTA; National Cable & Telecommunications Association; www.ncta.com.
136. NEBB; National Environmental Balancing Bureau; www.nebb.org.
137. NECA; National Electrical Contractors Association; www.necanet.org.
138. NeLMA; Northeastern Lumber Manufacturers Association; www.nelma.org.
139. NEMA; National Electrical Manufacturers Association; www.nema.org.
140. NETA; InterNational Electrical Testing Association; www.netaworld.org.
141. NFPA; NFPA; (National Fire Protection Association); www.nfpa.org.
142. NFPA; NFPA International; (See NFPA).
143. NFRC; National Fenestration Rating Council; www.nfrc.org.
144. NGA; National Glass Association; www.glass.org.
145. NHLA; National Hardwood Lumber Association; www.nhla.com.
146. NLGA; National Lumber Grades Authority; www.nlga.org.
147. NOFMA; National Oak Flooring Manufacturers Association; (See NWFA).
148. NOMMA; National Ornamental & Miscellaneous Metals Association; www.nomma.org.
149. NRMCA; National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF; NSF International; (National Sanitation Foundation International); www.nsf.org.
151. NSPE; National Society of Professional Engineers; www.nspe.org.
152. NSSGA; National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA; National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA; National Wood Flooring Association; www.nwfa.org.

155. PCA; Portland Cement Association; www.cement.org.
156. PDCA; Painting and Decorating Contractors of America; www.pdca.com.
157. PDI; Plumbing & Drainage Institute; www.pdionline.org.
158. PLASA; PLASA; (Formerly: ESTA; Entertainment Services and Technology Association); www.plasa.org.
159. RCSC; Research Council on Structural Connections; www.boltcouncil.org.
160. RFCI; Resilient Floor Covering Institute; www.rfci.com.
161. RIS; Redwood Inspection Service; www.redwoodinspection.com.
162. RMA; Rubber Manufacturers Association; www.rma.org.
163. SCTE; Society of Cable Telecommunications Engineers; www.scte.org.
164. SDI; Steel Deck Institute; www.sdi.org.
165. SDI; Steel Door Institute; www.steeldoor.org.
166. SEFA; Scientific Equipment and Furniture Association; www.sefalabs.com.
167. SEI/ASCE; Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
168. SGCC; Safety Glazing Certification Council; www.sgcc.org.
169. SIA; Security Industry Association; www.siaonline.org.
170. SJI; Steel Joist Institute; www.steeljoist.org.
171. SMA; Screen Manufacturers Association; www.smainfo.org.
172. SMACNA; Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
173. SMPTE; Society of Motion Picture and Television Engineers; www.smpte.org.
174. SPFA; Spray Polyurethane Foam Alliance; www.sprayfoam.org.
175. SPIB; Southern Pine Inspection Bureau; www.spib.org.
176. SSINA; Specialty Steel Industry of North America; www.ssina.com.
177. SSMA; Steel Stud Manufacturers Association; www.ssma.com.
178. SSPC; SSPC: The Society for Protective Coatings; www.sspc.org.
179. SWI; Steel Window Institute; www.steelwindows.com.
180. SWPA; Submersible Wastewater Pump Association; www.swpa.org.
181. SWRI; Sealant, Waterproofing, and Restoration Institute; www.swrionline.org.
182. TCNA; Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
183. TEMA; Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA; Telecommunications Industry Association; (Formerly: TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS; The Masonry Society; www.masonrysociety.org.
187. TPI; Truss Plate Institute; www.tpinst.org.
188. UFAC; Upholstered Furniture Action Council; www.ufac.org.
189. UL; Underwriters Laboratories Inc.; www.ul.com.
190. UNI; Uni-Bell PVC Pipe Association; www.uni-bell.org.
191. USGBC; U.S. Green Building Council; www.usgbc.org.
192. USITT; United States Institute for Theatre Technology, Inc.; www.usitt.org.
193. WASTEC; Waste Equipment Technology Association; www.wastec.org.
194. WCLIB; West Coast Lumber Inspection Bureau; www.wclib.org.
195. WCMA; Window Covering Manufacturers Association; www.wcmanet.org.

196. WDMA; Window & Door Manufacturers Association; www.wdma.com.
 197. WI; Woodwork Institute; (Formerly: WIC; Woodwork Institute of California); www.wicnet.org.
 198. WMMPA; Wood Moulding & Millwork Producers Association; (See MMPA).
 199. WPA; Western Wood Products Association; www.wwpa.org.
- E. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. DIN; Deutsches Institut für Normung e.V.; www.din.de.
 2. IAPMO; International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 3. ICC; International Code Council; www.iccsafe.org.
 4. ICC-ES; ICC Evaluation Service, LLC; www.icc-es.org.
- F. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. CPSC; Consumer Product Safety Commission; www.cpsc.gov.
 2. DOC; Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 3. DOE; Department of Energy; www.energy.gov.
 4. EPA; Environmental Protection Agency; www.epa.gov.
 5. OSHA; Occupational Safety & Health Administration; www.osha.gov.
 6. USDA; Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 7. USDA; Department of Agriculture; Rural Utilities Service; www.usda.gov.
 8. USDJ; Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 9. USPS; United States Postal Service; www.usps.com.
- G. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. ADAAG; Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; www.access-board.gov.
 2. CFR; Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 3. FS; Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.

- c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 4. USATBCB; U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- H. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CDHS; California Department of Health Services; (See CDPH).
 3. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 4. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 5. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 6. TFS; Texas Forest Service; Forest Resource Development and Sustainable Forestry; <http://txforests-service.tamu.edu>.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 USE CHARGES

- A. Sewer, Water, and Electric Power Service: Utility services from Owner's existing systems are available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction purposes.

1.3 QUALITY ASSURANCE

- A. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and local building code.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. HVAC Equipment: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.
- B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION AND USE

- A. Toilet and Drinking Water Facilities: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
 - 1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing Work, isolate the HVAC system in area where Work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in Work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within Work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited Work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 - 4. Provide for one entrance to be used for construction personnel and materials.
- E. Ventilation and Humidity Control: Provide adequate ventilation in enclosed areas throughout construction period required to: facilitate progress of Work; to protect Work and products against dampness and heat and cold; to prevent moisture condensation on surfaces; to provide suitable ambient temperatures for installation and curing of finish materials; to provide adequate ventilating; to meet health regulations for safe working environment; and, to prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction. Provide local exhaust ventilating to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons or property. Provide ventilating operations at all times personnel occupy an area, when subject to hazardous accumulations of harmful elements. Continue operation of ventilating system for as long as required after cessation of Work to ensure removal of harmful elements.
 - 1. In the event that the Owner accepts the Contractor's use of the permanent ventilation and air conditioning systems for the balance of the Work, provide and maintain temporary filters to adequately filter air being distributed through the ductwork and air handling

units to the supply outlets; disposable filter shall be placed in front of all exhaust registers to keep construction dirt out of exhaust ductwork.

- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 - 1. Do not overload existing electric power service.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions if existing lighting is not sufficient.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 - 2. All temporary equipment and wiring for temporary lighting shall be in accordance with the applicable provisions of the governing codes and regulations, the NEC, NEMA, UL, and OSHA standards. Install temporary service to comply with NFPA 70.
 - 3. Maintain temporary lighting to give safe working conditions, continuous service, and so as not to pose a threat to the Owner's property.
- H. Telephone Service: Provide temporary telephone service throughout construction period. Long distance calls shall be paid for by the party making the call. A pay phone is not acceptable.
 - 1. Provide superintendent with cellular telephone. A cellular phone is not acceptable as the only phone on the Project.
 - 2. Post numbers for emergency services, the Owner, the Architect, and other parties critical to the work over all project telephones.
- I. Internet Service: Provide computer with high-speed, broadband connection (examples: Business Class DSL, Multiple T1, Metro Ethernet), including router, equipped with hardware firewall; providing minimum 1Mbps upload and 1 Mbps download speeds for superintendent's use in sending and receiving e-mail.

3.2 SUPPORT FACILITIES INSTALLATION

- A. Project Signs: No Project identification signs or advertisements will be permitted on the Project site. Provide warning signs as required to inform tenants, public, and construction personnel of possible dangers.
- B. Construction Aids: Provide all items, such as lifting devices, scaffolding, staging, platforms, runways, ladders; and temporary flooring, as required by the various trades for the proper execution and protection of the Work. Provide such construction aids with proper guys, bracing, guards, railings and other safety devices as required by the governing authorities and OSHA.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, finishes and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- D. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and all applicable Federal, state and local codes and regulations; manage fire-prevention program.
- F. Security: Provide and maintain provisions for closing and locking the site to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- G. Moisture-Protection: Avoid trapping water in finished Work. Document visible signs of mold that may appear during construction. Prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Comply with manufacturers' written instructions for temperature, relative humidity, and exposure to water limits.

3.4 TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor.

2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- D. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

1.3 QUALITY ASSURANCE

- A. General: All bids shall be based on the products required in the Contract Documents.
- B. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 4. Protect stored products from damage and liquids from freezing.

1.5 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Components, materials, or parts required to be supplied in quantity within a Section shall be of the same manufacture, shall be interchangeable, and shall be the same with regard to function, texture, pattern, and color.
- B. Except for building equipment in service areas, no manufacturers' labels or name plates shall be visible on any component, unless required by local authorities having jurisdiction.

2.2 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
 - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 - 3. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
 - 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 - 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
- C. Visual Matching Specification: Where Specifications require matching an established Sample, provide a product that complies with requirements and matches sample specified. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.3 COMPARABLE PRODUCTS

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

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work. Cutting in this sense does not include demolition.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. 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
 - 2. 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.
 - 3. 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.
 - 4. 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.

- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of mechanical and electrical systems, and other construction affecting the Work.
- B. 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.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. **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.
- B. **Space Requirements:** Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. **Review of Contract Documents and Field Conditions:** Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 26 13 "Requests for Interpretation (RFI)."

3.3 CONSTRUCTION LAYOUT

- A. **Verification:** Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. **General:** The Work to be performed under the Contract Documents shall be laid out solely by the Contractor. Provide and pay for all construction layout work required for the Project. Under no circumstances will the Architect assume any responsibilities for laying out the Work.
 - 1. Establish benchmarks and control points to set lines and levels as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

3.4 INSTALLATION

- A. **General:** Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated. Where indicated to remain exposed, arrange overhead systems in an orderly manner.
 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. 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.
- H. 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.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. 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.
- I. 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.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

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

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. 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.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. 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.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 14 00 "Work Restrictions."
- F. 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.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Avoid cutting steel reinforcement.
 - a. Locate steel reinforcement using Ground Penetrating Radar or Ferroskan prior to cutting or drilling reinforced concrete and masonry. If existing steel reinforcement is in proposed cut or hole location, contact Architect before proceeding with the Work.
 4. 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.
 5. Proceed with patching after construction operations requiring cutting are complete.
- H. 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.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces 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.
 - a. 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.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

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

3.7 **PROGRESS CLEANING**

- A. General: Clean Project site and work areas daily, including common areas. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold 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).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout.

1.2 ACTION SUBMITTALS

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

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Project Record Documents:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record product data.
 - 4. Miscellaneous record submittals.
- D. Operation and maintenance manual(s).
- E. Warranties.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Submittals Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Prepare and submit a list of incomplete items (punch list), indicating the value of items on the list, and reasons why the Work is not complete.
 2. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, final certifications, and similar documents.
 3. 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.
 4. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
 5. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 6. Submit test/adjust/balance records.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- B. Procedures Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Complete final cleaning requirements.
 6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- C. Inspection: Submit a written request for inspection for Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment.
 2. Submit copy of Contractor's original Substantial Completion inspection list with Architect's annotations of items to be completed or corrected (punch list), endorsed and dated by Architect. Copy shall be certified by Contractor and state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance a minimum of 5 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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

1.8 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
1. Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up record prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later, and the locations of those items that need to be located for servicing.
 - b. Accurately record information in a readily understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark record prints completely and accurately.
 - e. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - f. Note Change Order numbers, alternate numbers, and similar identification where applicable.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Clearly mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Drawings, where applicable.
- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections such as tests and inspections, and inspections by authorities having jurisdiction. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.9 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 - f. Noise and vibration adjustments.
 - g. Effective energy utilization.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
 - i. Cleaning.
 - j. Control sequence.
 - k. Fuels, lubricants, tool, and other related items.
 - l. Identification systems.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period.

- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - b. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited access spaces, including plenums, shafts, and similar spaces.
 - d. Sweep concrete floors broom clean in unoccupied spaces.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

- f. 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.
- g. Remove labels that are not meant to be permanent.
- h. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- i. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- j. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- k. Clean ducts, blowers, and coils if units were operated without filters during construction.
- l. 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 lighting fixtures to comply with requirements for new fixtures.
- m. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

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

END OF SECTION 01 77 00

SECTION 02 41 19 - 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.

B. Related Requirements:

1. Section 01 14 00 "Work Restrictions" for restrictions on use of the premises due to Owner or tenant occupancy.
2. Section 01 32 00 "Construction Progress Documentation" for preconstruction photographs taken before selective demolition.
3. Section 01 50 00 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
4. Section 01 73 00 "Execution" for cutting and patching procedures.

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 ready for reuse.
- 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. Unless otherwise indicated, demolition waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.
- C. Materials to be reused remain the property of the Owner.

1.4 PREINSTALLATION MEETINGS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's ,Building Manager's and other tenants' on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator, stairs, entrances, and loading docks.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. As indicated on Drawings.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. If available, review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
 - 2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video and templates.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 14 00 "Work Restrictions."
- B. Existing Services/Systems to be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Building Manager will arrange to shut off indicated services/systems when requested by Contractor. Provide minimum 48 hours' notice when requesting shut-off.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
 - h. Fire Suppression System Partial or Complete Removal: Arrange for bypass of area to be removed so that overall building fire suppression system remains in operation. If continuous operation is not possible, coordinate with local Fire authorities; maintain firewatch during removal operations and until system can be restored to working order. Maintain fire extinguishers on the site.
- C. Ballasts: If ballast is not labeled "No PCBs," or if the label is illegible, contact a ballast recycler for disposal.

- D. Mercury-Containing Devices: Mercury-containing devices include thermostats, silent switches, mechanical switches and relays or contacts. Dispose of these devices with an appropriate recycler.
- E. Nickel-Cadmium and Lead-Acid Batteries: Exit signs, emergency lighting units, alarm systems, smoke detectors and carbon-monoxide detectors may contain nickel-cadmium or lead-acid. Arrange with an appropriate recycler for disposal.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

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 portable fire-suppression devices during flame-cutting operations and for after 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. When cutting concrete, masonry, wallboard and any other dust-producing materials, provide temporary barriers to prevent spread of dust into the rest of the building. Provide filters for mechanical systems and air ducts.
9. Dispose of demolished items and materials promptly.

B. 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 designated by Owner.
5. Protect items from damage during transport and storage.

C. 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.

- D. 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. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Covering and Glued-down carpets: 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.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Carpets, Carpet Tile, Acoustical Ceiling Panel and Tiles: Divert carpeting and ceiling tiles from local landfills. Remove and recycle products using Armstrong Reclamation Carpet/Tile Guidelines.
- B. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Refer to Section 01 73 00 "Execution" for progress cleaning.

3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Refer to Drawings.

END OF SECTION 02 41 19

SECTION 03 54 16 - HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hydraulic-cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
- C. Field Test Results: Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- D. Preconstruction Test Reports: Prior to the installation of the underlayment, provide test results indicating slab moisture vapor emission meets the requirements of the finish flooring manufacturer in accordance with ASTM F 2170.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer and factory trained 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.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD 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 hydraulic-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified 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.
- C. IIC-Rated Assemblies: For IIC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 492 and classified according to ASTM E 989 by an independent testing agency.

2.2 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

- A. Hydraulic Cement 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, provide one of the following:
 - a. ARDEX GmbH; K-15 Self-Leveling Underlayment Concrete.
 - b. BASF, Master Builders Solutions; MasterTop 111SL.
 - c. L&M Construction Chemicals, Inc.; Levelex.
 - d. MAPEI Corporation; Ultraplan 1 Plus.

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. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
1. VOC Content: Provide coating with VOC content of 200 g/L or less.
- F. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
1. VOC Content: Provide coating with VOC content of 250 g/L or less.
- G. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

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.
- B. Provide clean, dry, neutral-pH substrate for underlayment application.

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.
- C. 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. Do not use solvents.
1. Moisture Testing: Perform tests recommended by flooring manufacturer, but not less stringent than one of the following:
 - a. 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.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
 2. Alkalinity and Adhesion Testing: Perform tests recommended by flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
- D. Metal Substrates: Mechanically remove, according to manufacturer's written instructions, rust, foreign matter, and other contaminants that might impair underlayment bond. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.
- E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
1. 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 adhesion to substrate and between coats.
 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. Apply a final layer without aggregate to product surface.
 2. Feather edges to match adjacent floor elevations.

- D. Use the straightedge method test, ACI 117 to verify that there is no more than 1/4 inch (6 mm) deviation in flatness in a 10 foot span.
1. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface with carpeting:
 - a. Specified Overall Values (SOV):
 - 1) Flatness: F_F 25.
 - 2) Levelness: F_L 20.
 - b. Minimum Local Values (MLV):
 - 1) Flatness: F_F 17.
 - 2) Levelness: F_L 15.
 2. Finish surfaces to the following tolerances for suspended slabs, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
 - a. Specified Overall Values (SOV):
 - 1) Flatness: F_F 30.
 - 2) Levelness: F_L 20.
 - b. Minimum Local Values (MLV):
 - 1) Flatness: F_F 24.
 - 2) Levelness: F_L 15.
 3. Apply a final layer without aggregate to product surface.
 4. Feather edges to match adjacent floor elevations.
- E. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- F. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- G. Apply surface sealer at rate recommended by manufacturer.
- H. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 FIELD QUALITY CONTROL

- A. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

3.5 PROTECTION

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

END OF SECTION 03 54 16

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal fabrications, bracing and supports for construction specified in other Sections.
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring wall-mounted products.

1.2 ACTION SUBMITTALS

- A. Shop Drawings: Submit shop drawings including plans, elevations, sections, details of installation, and attachments to other Work.
 - 1. For installed products indicated to comply with performance requirements, include seal and signature of qualified professional engineer responsible for their preparation.
 - 2. Include plans and elevations at not less than 1" to 1'-0" (1:20) scale, and include details of sections and connections at not less than 3" to 1'-0" (1:5) scale.
- B. Delegated-Design Submittal: For installed products indicated to comply with performance requirements, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project for a minimum of 5 years, with a record of successful in-service performance, with sufficient production capacity to produce required units without causing delay in the Work.

- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated for this Project in material, design, and extent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 FIELD CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal fabrications indicated below.
- B. Structural Performance:
 - 1. Countertop and Vanity Framing: Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:
 - a. All deadloads.
 - b. 500 pound (226 kg) live load placed on the countertop and vanity.
 - c. Deflection at Midspan: $L/1000$ times span or 1/8-inch (3-mm), whichever is less.
 - 2. Sliding Wood Door Framing: Fabricate and install framing so that, when installed, it is capable of supporting all deadloads and withstanding the live loads imposed on it from the operation of the door.

2.2 METALS

- A. Metal Surfaces, General: For metal fabrications 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, blemishes, or roughness.
- B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
- C. Ferrous Metals:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 2. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, or hot-formed steel tubing complying with ASTM A 501.
 - 3. Steel Pipe: ASTM A 53, Type S - Seamless, Grade A suitable for close coiling or cold bending, standard weight (Schedule 40) minimum, unless otherwise indicated or required to satisfy performance requirements, black finish.
 - 4. Slotted Channel Framing: Cold-formed metal channels with continuous slot and with flanged edges returned toward web complying with MFMA-4 and fabricated from steel complying with ASTM A 1008/A 1008M. Width, depth, and metal thickness as required to suit performance requirements.
 - 5. Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010) malleable iron or ASTM A 48, Class 30 (ASTM A 48M, Class 200), gray iron.
 - 6. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664 and compatible with finish paint systems indicated.
 - 1. 94-258 Series Multi-Prime Fast Dry 2.8 VOC Universal Metal Primer; Pittsburgh Paints.
 - 2. B50 Z Kem Kromik Universal Primer Fast Dry; Sherwin-Williams Co.
 - 3. Series 37H Phenolic Alkyd Primer Chem-Prime; Tnemec.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, of type, grade, and class required by application indicated.
- B. Nonshrink, Nonmetallic Grout: ASTM C 1107, factory-packaged, nonstaining, noncorrosive, nongaseous grout.

2.5 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
 - 1. Welded connections may be used where bolted connections are shown.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Weld corners and seams continuously along entire line of contact. Use full penetration welds. Use materials and methods that minimize distortion and develop strength of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous. Make up threaded connections tight so that threads are entirely concealed.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices and fasteners to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Miscellaneous Framing and Supports: Provide steel framing and supports indicated and as necessary to complete the Work and which are not a part of the structural framework to comply with performance requirements.
 - 1. Fabricate units from structural 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.
 - 2. Overhead Supports for Sliding Wood Doors, : Fabricate supports from continuous steel shapes with attached bearing plates, anchors, and braces. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
 - 3. Countertop Framing: Fabricate countertop framing, using steel shapes and plates, and cold finished mild steel bars at exposed conditions, for support framing and plywood, to the thicknesses, sizes and shapes shown, and as required to produce work of adequate strength and durability. Use proven details of fabrication, as required to achieve proper assembly and alignment of the various components of the Work.

2.6 FINISHES

- A. Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items.
1. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces by removing oil, grease, and similar contaminants in accordance with SSPC -SP 1 "Solvent Cleaning," followed with SSPC-SP 3, "Power Tool Cleaning."
 2. Apply a minimum of one coat of shop primer to uncoated surfaces of metal fabrications, except those to be field welded, and those to be embedded in sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true. Drill holes for bolts to the exact diameter of the bolt. Provide screws threaded full length to the screw head.
- 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.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Quality of Workmanship:
 - a. At concealed connections: No improvement from mill finish, except preparation necessary for priming is required. Welds are not required to be ground.
 - b. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness, pits, mill marks, nicks, or scratches shows after finishing and contour of welded surface matches that of adjacent surface. Defects and distortions shall not be visible to the eye nor show through painted or polished surfaces.
- D. Touchup surfaces and finishes after erection. For materials exposed to view in the finished Project, clean field welds, bolted connections, and abraded areas and touchup paint with the same material as used for shop painting.

END OF SECTION 05 50 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes miscellaneous carpentry.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of process and factory-fabricated product indicated.
 - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; for lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Comply with DOC PS 20 "American Softwood Lumber Standard" and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
 - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.
- B. Wood Panels:
 - 1. Plywood: Comply with DOC PS 1 "Construction and Industrial Plywood" for plywood panels. Use exterior grade for panels in wet conditions.
 - 2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Provide chemical fire retardant process tested and labeled by UL with flame spread and smoke developed ratings of 25 or less. Comply with performance requirements in AWWA U1, Use Category UCFA as a minimum for pressure treatment. Size wood before treatment so that minimum cutting will be required after treatment. Kiln dry lumber to a maximum 19 percent moisture content, kiln dry plywood to a maximum 15 percent moisture content, after treatment. Treat indicated items and the following:
 - 1. Wood members required to be treated by Building Code having jurisdiction at the site and wood members specified as fire-retardant-treated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of UL.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.4 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber for support or attachment of other construction, including blocking, nailers, and similar members.
- B. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
 - 1. Mixed southern pine, No. 2 grade; SPIB.
 - 2. Western Woods; WCLIB or WWPA, No. 2 Grade.

2.5 PANEL PRODUCTS

- A. Concealed Plywood for Countertop Underlayment:

1. APA Exterior sheathing, manufactured with no added urea-formaldehyde, in thickness as indicated but not less than 3/4 inch (19 mm).
 - a. Roseburg Forest Products; Oregon Plywood 2 softwood plywood sheathing.
 - b. Roy O. Martin Lumber Company, Limited Partnership (MARTCO), Plywood Division; exterior softwood plywood sheathing.
 - c. Potlatch Forest Products Corporation, Forest Products Div., exterior softwood plywood sheathing.

- B. Medium-Density Fiberboard (Moisture Resistant): A sustainable, moisture-resistant, medium density fiberboard (MDF) panel manufactured from 100 percent post industrial recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf (769 kg/m³) density except that minimums for screw holding capacity on face and edge shall be 350 pounds (1555 N) and 275 pounds (1222 N) respectively; an ASTM E 84 Class C flame spread rating, minimum 3/4 inch (19 mm) thick, edged and faced as specified, fabricated with binder containing no urea formaldehyde.
 1. SierraPine Composite Solutions; FSC Certified Medex.

- C. Telephone, Data, Security, Mirror, and Electrical Equipment Backing Panels:
 1. APA, Exposure 1, C-C Plugged, fire-retardant treated, manufactured with no added urea-formaldehyde, in thickness indicated or, if not indicated, not less than 3/4 inch (19.05 mm) thick.

- D. Medium-Density Fiberboard (fire rated): A sustainable, fire rated, medium density fiberboard (MDF) panel manufactured from 100 percent post industrial recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf (769 kg/m³) density except that minimum for screw holding capacity on face shall be 230 pounds (1022N); an ASTM E 84 Class A flame spread rating, minimum 3/4 inch (19 mm) thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 1. Roseburg Forest Products; SierraPine; NAUF Medite FR.
 2. Panel Source International; Pyroblock NAUF Grade MDF.

2.6 FASTENERS

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

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

- C. Nails, Wire, Brads, and Staples: Select material, type, size, and finish required for each use.
 1. ASTM F 1667 for driven fasteners such as nails, spikes and staples.
 2. ASTM F 547 for nails used with wood and wood based products.

- D. Wood Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- 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 4 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

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- C. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PANEL PRODUCT INSTALLATION

- A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," and local utility requirements, if any, for plywood backing panels utilized as indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Countertop Underlayment: Bolt to miscellaneous steel framing.
2. Plywood Backing Panels: Secure to wall using proper fastening devices for substrates encountered spaced 12 inches (305 mm) on center maximum at perimeter 1/2 inch (12.7 mm) from corners and three rows of 3 fasteners each in the backerboard field. Countersink fasteners flush with plywood surface. Butt adjacent panels without lapping.

END OF SECTION 06 10 53

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes interior architectural woodwork:
1. Wood cabinets.
 2. Closet and utility shelving.
 3. Interior standing and running trim.
 4. Shop finishing of interior woodwork to receive transparent finish.
- B. Related Requirements:
1. Section 05 50 00 "Metal Fabrications" for concealed countertop supports.
 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for concealed blocking for millwork items.
 3. Section 12 36 40 "Stone Countertops" for stone countertops applied to architectural cabinetry.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each material and product specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
1. Cabinet hardware and accessories.
 2. Glass products and glazing materials.
 3. Finishing materials and processes.
 4. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Submit shop drawings showing locations of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Elevations shall be drawn at a scale of not less than 1/2" = 1'-0" (1:25). Details shall be drawn at a scale of not less than 3" = 1'-0" (1:5).
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes for plumbing, electrical, computer and telephone equipment and other items installed in architectural woodwork.
 3. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
- C. Samples: Submit samples of the following:

1. Five veneer leaves representative of and selected from each flitch to be used for transparent-finished woodwork.
2. Three 12 inch (305 mm) by 12 inch (305 mm) sample sets containing a minimum of two or more samples of transparent finished wood-veneer panel products, fabricated from each core product, for each veneer specified and demonstrating the proposed full range of appearance characteristics to be expected in completed work. Include at least one face-veneer seam in each sample.
3. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge. Furnish lumber in 12 inch (305 mm) lengths, furnish panel samples in 12 inch (305 mm) squares.
4. Glass and Acrylic Panels: 12 inches (305 mm) by 12 inches (305 mm) of each type specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for all countertop materials. Where countertop materials are recommended to be protected with hot pads, provide manufacturers properly sized for the hot equipment designed to be placed thereon.

1.4 QUALITY ASSURANCE

- A. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer - acceptable to the Architect - to assume undivided responsibility for woodwork specified in this Section, including fabrication, finishing, and installation. The manufacturer shall have a minimum of 15 years successful experience in the custom fabrication and installation of architectural woodwork comparable to that shown and specified, be a member of the AWI, maintain an organized quality control program, perform its own in-house veneer lay-up work, and who retains facilities with sufficient capacity and quality to produce the required architectural woodwork without causing delay to the Project.
- B. Quality Standard: Fabricate and install all architectural woodwork in accordance with the applicable requirements of Architectural Woodwork Standards, 2nd edition, published jointly by AWI, AWMAC, and WI, unless more stringent requirements are specified or shown.
- C. Fire Performance Characteristics: Provide materials identical to those tested for the following fire performance characteristics per ASTM test methods indicated by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.
 1. Surface Burning Characteristics for Concealed Blocking, Furring, and Door Subframing: Not exceeding a flame spread of 25, and smoke developed of 50 when tested per ASTM E 84 for 30 minutes.
 2. The fire performance finish requirements for all exposed interior wall and ceiling woodwork (including the paneling but not limited to paneling) substrates in fully sprinklered spaces shall be as follows which has been taken from the IBC 2012, Table

803.9. Footnotes to Table 803.9 that are pertinent to the project are also made a part of this specification.

Use Group	Interior Exit Stairways, Exit Ramps, and Exit Passageways	Corridors and Enclosures for Exit Access Stairways, and Exit Access Ramps	Rooms and Enclosed Spaces
A-1, and A-2	Class B	Class B	Class C
A-3	Class B	Class B	Class C
B, E, M, R-1	Class B	Class C	Class C
S	Class C	Class C	Class C

Class B: Flame spread 26-75, smoke developed 0-450 when tested in accordance with ASTM E 84.

Class C: Flame spread 76-200, smoke developed 0-450 when tested in accordance with ASTM E 84.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify actual dimensions of other construction by accurate field measurements before fabrication of woodwork; and indicate measurements on final 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.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. 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 interior architectural woodwork can be supported and installed as indicated.

1.8 PREINSTALLATION COORDINATION MEETING

- A. Meet at the Project site, prior to installation of architectural woodwork, to review the substrate preparation, installation and coordination with other trades, special details and conditions, and other topics related to the architectural woodwork. The preinstallation meeting shall include the Architect, the Contractor, architectural woodworker, and any subcontractors affected by the architectural woodwork installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of the AWS quality standard for each type of woodwork and quality grade specified.
- B. Lumber Standards: Comply with applicable provisions for grading and workmanship of AWS Architectural Woodwork Standards, Section 3, and the requirements shown and specified; where standards conflict the more stringent shall apply. Provide lumber surfaced 4 sides (S4S) and fabricated to profiles shown. All lumber shall be kiln dried to the moisture content indicated in AWS, Section 2.
 - 1. Furring, Blocking, Shims: No. 1 Common; Southern Pine.
 - 2. Door Subframes: No. 1 Common Southern Pine, fire retardant treated to reduce combustibility.
 - 3. Solid Hardwood for Opaque Finish (WD##): Plain sawn Yellow Poplar, free from checks, splits, sound knots.
 - 4. Solid Hardwood for Transparent Finish (WD##): Matching each of the Architect's veneer samples; refer to Finish Schedule on the Drawings for each specie.
- C. Wood Veneers:
 - 1. Species, Matching, and Cut for Transparent Finish: Complying with AWS, Section 4, and the following:
 - a. (WD##) Specie and figuring as indicated on the Finish Schedule, book matched unless otherwise indicated, minimum 5 inch (127 mm) width leaves, complying with HPVA HP-1, Grade AA, matching Architect's sample.
- D. Wood Panel Products:

1. Medium-Density Fiberboard (non-moisture resistant): A sustainable, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 47 pcf (752 kg/m³) density except that minimum for screw holding capacity on face shall be 300 pounds (1333 N); an ASTM E 84 minimum Class C flame spread rating, minimum 3/4 inches (19 mm) thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 - a. Roseburg Forest Products; NAUF Medite II.
 2. Medium-Density Fiberboard (moisture resistant): A sustainable, moisture-resistant, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf (769 kg/m³) density except that minimum for screw holding capacity on face shall be 325 pounds (1445 N) respectively; an ASTM E 84 Class C flame spread rating, minimum 3/4 inches (19 mm) thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 - a. Roseburg Forest Products; NAUF Medex.
 3. Medium-Density Fiberboard (fire rated): A sustainable, fire rated, medium density fiberboard (MDF) panel manufactured from minimum 82 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf (769 kg/m³) density except that minimum for screw holding capacity on face shall be 250 pounds (1112 N); an ASTM E 84 Class A flame spread rating, minimum 3/4 inches (19 mm) thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 - a. Roseburg Forest Products;NAUF Medite FR.
 4. Medium Density Particleboard: A medium density particleboard (MDP) panel manufactured from 100 percent post industrial recycled wood residuals complying with ANSI A208.1, Type M-3-with a minimum 45 pcf (721 kg/m³) density except that minimum for screw holding capacity on face shall be 247 pounds (1098 N), an ASTM E 84 minimum Class C flame spread rating; minimum 3/4 inches (19 mm) thick, edged and faced as specified and manufactured with binder containing no added urea-formaldehyde.
 5. Hardboard: ANSI A135.4.
 6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde. Available Products:
 - a. Panel Source International, Inc.; PureKor .
- E. Glass: Clear tempered float glass, complying with ASTM C 1036, Type I, Class 1, Quality q3, and ASTM C 1048 Kind FT, thickness as indicated.
1. Prior to tempering, cut glass to required sizes and profiles as determined by accurate measurement of supporting standoff hole locations.
 2. Hole Cutting: Unless otherwise recommended by the glass manufacturer, comply with the requirements of ASTM C 1048, Article 7.8 for hole placement, minimum hole

diameter, and dimensional tolerances of holes and this specification. Unless otherwise recommended by the glass manufacturer, locate holes not less than 4 inches (102 mm) from glass edges, hole diameter shall be at least 1/8 inch (3 mm) larger than the shank of the screw fastener and screw sleeve spacers used for the rosette assemblies. Chips and flakes at hole edges shall not be permitted, and the inner surfaces of holes shall be smooth polished to match glass panel edges.

3. Edge Treatment: All glass edges shall have an arrised edge profile (small bevel of width not exceeding 1/16 inch (1.5 mm) at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of glass) surface.
- F. Stone: Refer to Section 12 36 40 "Stone Countertops."
- G. Adhesives, General: Use only low emitting VOC adhesives that leave no glue lines on finished surfaces of architectural woodwork. Do not use adhesives that contain urea formaldehyde.
1. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesives: 80 g/L.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
1. Do not use treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber or panel products.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
 3. Treat only door subframing, blocking and furring items.
- B. Fire-Retardant-Treated Lumber: Materials impregnated with fire-retardant chemical formulations to comply with AWPA U1, Use Category UCFA. Kiln-dry material after treatment to levels required for untreated woodwork.
- C. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.
- D. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials for a complete installation of architectural woodwork, except for items specified in Section 08 71 00 "Door Hardware."
- B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- C. Frameless Concealed Hinges for Cabinet Doors (European Type): Concealed all-metal furniture hinges adaptable or engineered for 35 mm hinge cup boring pattern, with minimum 155 degree opening angle, three-dimensional hinge having adjustments located in the steel hinge arm, steel or die-cast zinc hinge cups, mounting plates, and plastic insertion dowels to receive hinge screws. Automatic soft closing shall engage only in the last 10 degrees of swing. All hinge pins and linkages shall be hardened. Complying with BHMA A156.9, B01602. Bright nickel finish (US15).
1. Hinge Quantity: Provide hinge quantity as recommended by hinge manufacturer based on cabinet door width, weight, thickness, door material, and hinge cup selection.
 2. Metal Furniture Hinge Products and Manufacturers: One of the following:
 - a. Basis of Design: Grass Tiomos Series; Grass America, Inc.; Kernersville, NC.
 - b. Blumotion Series; Blum USA; Stanley, NC.
 - c. Salice; Silencia Series 200.
- D. Pulls: As Indicated on the Drawings.
- E. Catches: Magnetic, complying with BHMA A156.9, B03141 for single doors and B03161 for double doors.
1. For Single Doors: One of the following:
 - a. CD41 Single Magnetic Cabinet Catch; Stanley Commercial Hardware.
 - b. 900; Rockwood Manufacturing Company, Rockwood, PA.
 - c. 246.94.701 housing x 246.94.702 counterpiece; Hafele America Co. Archdale, NC.
 2. For Double Doors: One of the following:
 - a. 901; Rockwood Manufacturing Company.
 - b. CD45 Double Magnetic Cabinet Catch; Stanley Commercial Hardware.
- F. Cabinet Shelf Rests: Nickel plated brass or steel, or stainless steel, minimum 6 mm diameter shelf support pegs in sockets, complying with BHMA A156.9, B04013. One of the following:
1. Hafele 282.01.701 x 282.50.704; Hafele America, Co.
 2. K-10S with K-2 Sleeve; Brusso, Inc.
 3. 331 Series Flat Top Shelf Support Pin with 325 Series Insert Grommet; Knappe and Vogt.
- G. Closet Rods and Flanges: 1-1/2 inch (38 mm) diameter, satin finished stainless steel with matching end flanges.

- H. Drawer Slides:
1. Drawers less than 4 inches (102 mm) deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 lb. capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
 2. Drawers greater than 4 inches (102 mm) but less than 8 inches (203 mm) deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 lb. capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
 3. Drawers greater than 8 inches (203 mm) deep: Similar to Accuride 4032 having full extension carburized steel ball bearing, rail mounting, 150 lb. capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
- I. Silencers: Provide rubber silencers on jamb and/or head and sill strike areas of all cabinet doors and drawers, 2 for paired doors, and 3 for single doors. Silencers shall be approximately 1/4-inch (6.4-mm) diameter, color compatible with adjacent finish.
- J. Grommets for Cable Passage through Countertops: 2-1/2-inch (64-mm) OD, , metal grommets and matching metal caps with slot for wire passage.
1. Product: Subject to compliance with requirements, provide "EDP Flip-Top 2-1/2" hole MM Solid Metal series" by Doug Mockett and Co., Inc.
- K. Exposed Hardware Finishes: Unless otherwise specified above, or on the Drawings, all exposed portions of the woodwork hardware shall comply 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. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.
 3. Satin Stainless Steel: BHMA 630.
 4. Bright Stainless Steel: BHMA 629.
- L. Stainless Steel Trim: Custom fabricate stainless steel trim shapes to the sizes, shapes and profiles shown from the following materials. Provide in standard commercial tempers and hardness, as required for fabrication, strength and durability from Type 304 alloy. Form exposed work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to a radius of approximately 1/32 inch (0.79 mm) radius, unless otherwise shown. Miter exposed corner joints and machine fit to a hairline joint. All sheet goods shall be provided finished one side only. Finish designation shown on the Drawings are NAAMM nomenclature.
1. Sheet and Plate: ASTM A 666.
 2. Bar Stock: ASTM A 276.
 3. Pipe: ASTM A 312, Grade TP 304.
 4. Tubing: ASTM A 554, Grade MT 304.

- M. Stainless Steel Trim Finish: Provide the following mechanical finish to the exposed surfaces of the fabricated work to the extent indicated (NAAMM nomenclature), with texture and reflectivity as required to match the Architect's sample.
 - 1. No. 4 (bright directional polish).
- N. Steel Reinforcing: Carbon steel shapes, tubes and plates complying with ASTM A 36 (shapes and plates), and ASTM A 500 or A 501 (for tubes).
 - 1. Shop Primer for Concealed Steel Reinforcing: Provide fast curing, lead and chromate free, universal modified alkyd primer complying with performance requirements in FS TT-P-664.
 - 2. Electrodes for Concealed Steel Reinforcing: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded.
- O. Hanging (Zee Clip) Strips: Extruded aluminum zee type interlocking clips; type, size and quantity for the condition of use.
- P. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1.
- Q. Nails, Wire, Brads, and Staples: Select material, type, size, and finish required for each use.
 - 1. ASTM F 1667 for driven fasteners such as nails, spikes and staples.
 - 2. ASTM F 547 for nails used with wood and wood based products.
- R. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.
- S. Blind Splines: Specialty devices, as required for tight butt joining, types and size as recommended by woodwork fabricator.
- T. Covercaps: Where mortises of fastener heads, or draw downs are exposed (blind holes) in finished work, provide black plastic covercaps.

2.4 FABRICATION, GENERAL

- A. General: Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to the maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting. The width of scribe and filler panels shall not exceed 1/2 inch (13 mm), or 1/2 inch (13 mm) clear dimension from adjacent wall to outside face of cabinet door in a 90 degree position, whichever is greater.
 - 1. Interior Woodwork Grade: Premium complying with the referenced quality standard.
- B. Fabricate woodwork to dimensions, profiles, and details indicated.

1. Reinforcing shown is minimum. Provide additional steel and lumber reinforcing as required to sustain imposed loads and to ensure a rigid assembly.
 2. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
- C. Shop cut openings to maximum extent possible, to receive hardware, appliances, plumbing fixtures, 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.
1. Seal edges of openings in countertops with a coat of varnish.
 2. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.5 WOOD CABINETS FOR TRANSPARENT FINISH

- A. AWS Type of Cabinet Construction: Flush overlay.
- B. Wood Veneered Surfaces:
1. Wood Veneered Species and Matching:
 - a. Wood Veneer Species: As indicated on the Drawings and in the Finish Schedule.
 - b. Matching:
 - 1) Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels unless otherwise indicated on the Drawings.
 - 2) Matching of Veneer Leaves: Book match unless otherwise indicated.
 - 3) Veneer Matching within Panel Face: Center match unless otherwise indicated.
 - 4) Veneer Matching within Room: Provide cabinet veneers in each room and space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.
- C. Semiexposed Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.
1. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
 2. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.6 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE AND TRANSPARENT FINISHES

- A. General: Complying with AWS Sections 3 and 6, fabricated from solid hardwood with scarfed joints, profiles as indicated, finishes as indicated.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Wood Species: Poplar for opaque finishes; solid hardwood plank finished with transparent finished wood veneer in veneer cut as indicated on the Drawings to match adjacent transparent finished veneered items.

2.7 CLOSET AND UTILITY SHELVING

- A. General: Comply with AWS Section 10 and as follows.
- B. Shelf Material: 3/4 inch thick plywood where indicated to be painted.
- C. Cleats: 3/4-inch (19-mm) solid lumber.
- D. Finishes: As shown and scheduled on the Drawings.

2.8 SHOP FINISHING

- A. Production finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Priming of interior architectural woodwork with field applied opaque finish required to be performed at fabrication shop are specified in this Section. Refer to Section 09 91 23 "Interior Painting" for finishing opaque finished architectural woodwork.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.
 - 2. Gluing of face veneers shall, where possible, be by the hot plate method; glued surfaces shall be in close contact throughout. Glue stains will not be permitted.
 - 3. Grain of all transparent finished wood shall run in the direction shown, or if not shown, as accepted on the shop drawings.
- D. Exposed Surfaces:

1. Transparent Finish:
 - a. Grade: Premium.
 - b. AWS System 5: Conversion Varnish for close grain woods.
 - c. Staining: Natural to match Architect's sample.
 - d. Sheen: Match Architect's samples.
 2. Opaque Finish:
 - a. Grade: Custom.
 - b. AWS System 5: Conversion Varnish.
 - c. Color and Sheen: Match Architect's paint samples.
- E. Unexposed Wood Finish: Shop-applied alkyd type primer-sealer.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with requirements of the AWS for the same grade specified in this Section for type of woodwork involved.
 1. Install woodwork level, plumb, true, with no distortions, and with no variations in flushness of adjoining surfaces. Shim as required with concealed shims.
 2. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- B. Anchor woodwork to blocking built in or directly attached to substrates. Secure to blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- C. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches (2438 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.

- D. 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 without sag, bow, or other variation from a straight line.
 2. Maintain veneer sequence matching of cabinets with transparent finish.
 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) on center with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood blocking, or hanging strips or with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
- E. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Calk space between backsplash and wall with silicone sanitary sealant specified in Section 07 92 00 "Joint Sealants."
 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (406 mm) on center and to walls with adhesive.
 3. Natural Stone Tops: Refer to Section 12 36 40 "Stone Countertops."

3.3 ADJUSTING AND CLEANING

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

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer, that ensures that woodwork will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 40 23

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
1. Floors.
 2. Roofs.
 3. Walls and partitions.
 4. Smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of through penetration firestop system product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Through-Penetration Firestopping Schedule: Submit, for information only, a Through-Penetration Firestopping Schedule indicating the type of through-penetration firestop system to be installed for each penetration. Indicate each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated, and listed in the "Through Penetration Firestopping Schedule" at the end of Part 3 of this Section.
1. Submit documentation, including illustrations, from Underwriters Laboratories applicable to each through-penetration firestop.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- B. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- C. At Project Closeout, submit a Record Schedule, signed by the Installer, of systems installed, the UL design designations, and the location of each system. The submittal must have the Installer's signature.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed, by firestop system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its firestop system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestop tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements.
 - a. Through-penetration firestop systems corresponding to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) ITS in "Directory of Listed Products."

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 materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet.
- B. Ventilate through-penetration firestop systems per manufacturer's written 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 and provide through-penetration firestop systems to accommodate sizes of sleeves, openings, core-drilled holes, or cut openings.
- 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 Architect, Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated floor assemblies.
 - 3. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814 or UL 1479, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814 or UL 1479, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - 1. Floor penetrations located outside wall cavities.
 - 2. Floor penetrations located outside fire-resistive shaft enclosures.
 - 3. Penetrations located in construction containing fire-protection-rated openings.
 - 4. Penetrating items larger than 4 inch (100 mm) diameter nominal pipe or 16 square inch (10,323 square mm) in overall cross-sectional area.
 - 5. Provide T-rating not less than the required rating of the element penetrated, but not less than 1 hour, minimum.

- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
- E. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide through-penetration firestop systems that are UL listed for the penetrations listed in UL-Classified Through Penetration Fire Stopping Assemblies in the Schedule at the end of Part 3 of this Section.

2.3 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 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.
 - 4. Plastic Foam Adhesives: 50 g/L.
 - 5. Adhesives for Porous Materials (Except Wood): 50 g/L.
 - 6. Fiberglass Adhesives: 80g/L.
 - 7. Primers, Sealers and Undercoaters: 200 g/L.
- C. Accessories: Provide components for each through-penetration firestop system needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.

- b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
- 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.
- D. Gypsum Products: The use of gypsum products for through-penetration firestopping is strictly prohibited.
- E. Acoustical Performance: Provide non-hardening resilient firestop material at penetrations, sleeves and passthroughs in acoustic construction assemblies.
- 1. Acceptable Products:
 - a. Specified Technologies, Inc. Elastomeric Sealant ES100
 - b. Johns Manville Firetemp CI Caulk.
 - c. 3M Fire Barrier 2001 Silicone RTV Foam.
 - d. Hilti Flexible Firestop Sealant CP 606.

2.4 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. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.
- C. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12 inches (305 mm) of unreinforced annular space.
- D. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- E. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.
- F. 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.

- G. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- H. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- I. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- J. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- K. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- L. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- M. 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.
- N. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- O. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.5 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply 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.
- B. Identify fire-resistance-rated construction (including walls, shaft enclosures, partitions, and smoke barriers) with signs or stenciling permanently installed above suspended ceilings or in other concealed spaces. The lettering shall be 3 inches (75 mm) in height and spaced 12 feet (3658 mm) on center:
 - 1. The words -HOUR FIRE AND SMOKE WALL - PROTECT ALL PENETRATIONS."

- a. Replace blank with actual fire-resistance rating.

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

- Select UL-classified systems from the attached schedule and submit "Through-Penetration Firestopping Schedule" as specified in Article 1.3, Submittals.

PENETRATION FIRESTOPPING SCHEDULE								
FIRESTOPPING SYSTEMS ARE LISTED USING THE ALPHA-ALPHA-NUMERIC IDENTIFICATION SYSTEM PUBLISHED IN UL'S FIRE RESISTANCE DIRECTORY, VOLS. 2A - 2B								
TYPE OF PENETRANT	CONSTRUCTION							
	FLOOR PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR F)				WALL PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR W)			
	CONCRETE FLOORS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 5 INCHES (127 MM)	CONCRETE FLOORS WITH A MINIMUM THICKNESS OF MORE THAN 5 INCHES (127 MM)	FRAMED FLOORS	FLOOR-CEILING ASSEMBLIES CONSISTING OF CONCRETE WITH MEMBRANE PROTECTION	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 8 INCHES (203 MM)	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS OF MORE THAN 8 INCHES (203 MM)	FRAMED WALLS	COMPOSITE PANEL WALLS
NO PENETRATING ITEMS	C-AJ-0001-0999 or F-A-0001-0999	C-BJ-0001-0999 or F-B-0001-0999	F-C-1001-1999		C-AJ-0001-0999, C-BJ-0001-0999, or W-J-0001-0999		W-L-0001-0999	
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001-1999 or F-A-1001-1999	C-BJ-1001-1999, C-BK-1001-1999, or F-B-1001-1999	F-C-1001-1999	F-E-1001-1999	C-AJ-1001-1999, C-BJ-1001-1999, or W-J-1001-1999	C-BK-1001-1999 or W-K-1001-1999	W-L-1001-1999	W-N-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001-2999 or F-A-2001-2999	C-BJ-2001-2999, C-BK-2001-2999, or F-B-2001-2999	F-C-2001-2999	F-E-2001-2999	C-AJ-2001-2999, C-BJ-2001-2999, or W-J-2001-2999	C-BK-2001-2999 or W-K-2001-2999	W-L-2001-2999	W-N-2001-2999
ELECTRICAL CABLES	C-AJ-3001-3999 or F-A-3001-3999	C-BJ-3001-3999, C-BK-3001-3999, or F-B-3001-3999	F-C-3001-3999	F-E-3001-3999	C-AJ-3001-3999, C-BJ-3001-3999, or W-J-3001-3999	C-BK-3001-3999 or W-K-3001-3999	W-L-3001-3999	
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001-4999 or F-A-4001-4999	C-BJ-4001-4999 or F-B-4001-4999			C-AJ-4001-4999, C-BJ-4001-4999, or W-J-4001-4999	W-K-4001-4999	W-L-4001-4999	
INSULATED PIPES	C-AJ-5001-5999 or F-A-5001-5999	C-BJ-5001-5999, C-BK-5001-5999, or F-B-5001-5999	F-C-5001-5999	F-E-5001-5999	C-AJ-5001-5999, C-BJ-5001-5999, or W-J-5001-5999	C-BK-5001-5999	W-L-5001-5999	W-N-5001-5999
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001-6999 or F-A-6001-6999	C-BJ-6001-6999			C-AJ-6001-6999, C-BJ-6001-6999, or W-BJ-6001-6999		W-L-6001-6999	
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001-7999 or F-A-7001-7999	C-BJ-7001-7999 or F-B-7001-7999	F-C-7001-7999	F-E-7001-7999	C-AJ-7001-7999, C-BJ-7001-7999, or W-J-7001-7999		W-L-7001-7999	W-N-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001-8999 or F-A-8001-8999	C-BJ-8001-8999 or F-B-8001-8999	F-C-8001-8999	F-E-8001-8999	C-AJ-8001-8999, C-BJ-8001-8999, or W-J-8001-8999		W-L-8001-8999	

Remarks: For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed penetration firestopping system selected from the applicable UL number range listed above that complies with Section 078413 "Penetration Firestopping" and that is suitable for the penetration conditions indicated for the Project.

END OF SECTION 07 84 13

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fire-resistive joint systems for the following:
 - 1. Floor-to-wall joints.
 - 2. Head-of-wall joints.
 - 3. Bottom of wall joints.
 - 4. Wall-to-wall joints.

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Fire Resistive Joint System Schedule: Submit, for information only, a Fire Resistive Joint Schedule indicating the type of fire resistive joint system to be installed for each joint. Indicate each kind of construction condition. Include fire resistive joint design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- B. Product Certificates: Signed by manufacturers of fire resistive joint system products certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed by the fire resistive joint system manufacturer as experienced and with sufficient trained staff to install manufacturer's

products according to specified requirements. A manufacturer's willingness to sell its fire resistive joint system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems In and Between Fire Resistance Rated Constructions: Provide systems with assembly ratings not less than that equaling or exceeding fire-resistance rating of constructions in which joints are located, as determined by UL 2079.

2.2 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide fire resistive joint systems indicated for each application in the Fire-Resistive Joint System Schedule at the end of Part 3.

2.3 JOINT FIRESTOPPING

- A. Compatibility: Provide joint firestopping systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. VOC Content: Provide joint firestopping systems that comply with the following limits for VOC content when calculated according to 40 CFR 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.
 - 4. Plastic Foam Adhesives: 50 g/L.
 - 5. Adhesives for Porous Materials (Except Wood): 50 g/L.
 - 6. Fiberglass Adhesives: 80g/L.
 - 7. Primers, Sealers and Undercoaters: 200 g/L.
- C. Accessories: Provide components of joint firestopping system, including forming materials, that are needed to install fill materials and to comply with Part 2 "Performance Requirements" Article. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install joint firestopping systems to comply with Part 2 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and to prepare inspection reports.
 1. Inspecting agency will state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
- B. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and inspecting agency has approved installed fire-resistive joint systems.
- C. If deficiencies are found, repair or replace fire-resistive joint systems so they comply with requirements.

3.5 CLEANING AND PROTECTING

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

3.6 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Designation System for Joints at the Intersection of Fire-Resistance-Rated Floor or Floor/Ceiling Assembly: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHDG.
- C. Floor-to-Wall, Fire-Resistive Joint Systems: UL-Classified (FW-Series) system as required to maintain floor to wall fire rating indicated.

- D. Head-of-Wall, Fire-Resistive Joint Systems: UL-Classified (HW-Series) system as required to maintain floor to wall fire rating indicated.
- E. Bottom-of-Wall, Fire-Resistive Joint Systems: UL-Classified (BW Series) systems as required to maintain bottom of wall fire rating indicated.
- F. Wall-To-Wall, Fire-Resistive Joint Systems: UL-Classified (WW-Series) system as required to maintain floor to wall fire rating indicated.

END OF SECTION 07 84 43

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each joint sealant product indicated.
- B. Samples: Submit samples for each exposed joint sealant product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers. Store and handle materials in compliance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: Not more than 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 - 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.
- B. Colors: For fully concealed joints, provide the manufacturer's standard color of sealant which has the best overall performance characteristics for the application shown. For exposed joints, the Architect will select colors from the manufacturer's standard colors.

2.2 JOINT SEALANTS

- A. Butt Glazing Sealant: Comply with ASTM C 920, Type S, Grade NS, Class 50; use NT, G, and A, black color unless otherwise indicated.
 - 1. Products and Manufacturers: Provide one of the following:

- a. 795; Dow Corning.
 - b. Spectrem 2; Tremco, an RPM Co.
 - c. Silpruf SCS 2000; Momentive.
 - d. Sika, Sikasil WS 295.
- B. Mildew-Resistant Silicone Sealant (use for joints at plumbing fixtures, toilet room countertops and vanities): Complying with ASTM C 920, Type S (single component), Grade NS (non-sag), class 25, Use NT (non-traffic), Substrate uses G, A, and O; and containing a fungicide for mildew resistance; white color.
1. Products: Provide one of the following:
 - a. Dow Corning; 786 Mildew Resistant Silicone Sealant.
 - b. Momentive; Sanitary SCS 1700.
 - c. Pecora Corporation; 898 Silicone Sanitary Sealant.
 - d. Tremco, an RPM Co.; Tremsil 200 Sanitary.
- C. Two-Part Polyurethane Sealant for Paving Applications:
1. For Paving Applications with Slopes not Exceeding 5% (Self Leveling): ASTM C 920, Type M, Grade P, Class 25; use T (except with a Shore A hardness of 35 or greater) and I (Class 1 or 2) for water immersion; and abrasion resistant,; one of the following:
 - a. Pecora Corporation; Urexpam NR-200.
 - b. Tremco, an RPM Co.; Vulkem, 445SSL.
 - c. Sika; Sikaflex 1c SL.
- D. Latex Sealant: Complying with ASTM C 834, Type OP (opaque sealants):
1. Products: Provide one of the following:
 - a. Pecora Corporation; AC-20 + Silicone.
 - b. DAP Products Inc.; Alex Plus Acrylic Latex Caulk Plus Silicone.
 - c. Tremco, an RPM Co.; Tremflex 834.

2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: One of the following preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding backings of flexible plastic foam complying with ASTM C 1330, and of type indicated below. Select shape and density of cylindrical sealant backings in consultation with the manufacturer for proper performance in specific condition of use in each case.

1. Type C: Closed-cell polyethylene foam material with a surface skin, which is nonabsorbent to liquid water and gas, non-outgassing in unruptured state; one of the following:
 - a. HBR Closed Cell Backer Rod; Nomaco, Inc.
 - b. MasterSeal 920; BASF Master Builders.
 - c. Mile High Foam, Backer Rod Mfg., Inc..

2.4 MISCELLANEOUS MATERIALS

- A. 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 with joint substrates.
- B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and which will not stain nor mar the finish of surfaces adjacent to joints to which it is applied.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with the recommendations of joint sealant manufacturer and the following requirements:
 1. Remove 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), existing joint sealants, oil, grease, water, and surface dirt.
 2. Clean concrete, masonry, unglazed surfaces of tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form-release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

- C. Installation of Sealant Backings: Install sealant backings of type 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.
- D. Installation of Sealants: Install sealants so they directly contact and fully wet joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform, concave shaped beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint.
- F. Cleaning: Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

- A. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - 1. Control and Expansion Joints on Exposed Interior Surfaces of Exterior Walls: Latex sealant.
 - 2. Perimeter Joints of Exterior Openings Where Indicated: Latex sealant.
 - 3. Vertical Control and Expansion Joints in Stone and Tile Surfaces: Latex sealant.
 - 4. Horizontal Control and Expansion Joints in Stone and Tile Flooring Surfaces: Two-Part Polyurethane Sealant for Paving Applications.
 - 5. Perimeter Joints between Interior Wall Surfaces and Frames of Interior Doors, Windows, and Elevator Entrances: Latex sealant.
 - 6. Perimeter Joints between Scalloped, Bent, or Warped Interior Wallboard Surfaces and Straight Trim: Latex Sealant.
 - 7. Joints between Plumbing Fixtures and Adjoining Walls, Floors, and Counters: Mildew resistant silicone sealant.
 - 8. Joints between Glass, and between Glass and Adjacent Substrates: Butt glazing sealant.

END OF SECTION 07 92 00

SECTION 08 12 13 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow metal door frames.
 - 1. The integration of a security system into the hollow metal door frame work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each product indicated. Include material descriptions, core descriptions, label compliance, sound and fire-resistance ratings, and finishes for each type of door frame specified.
- B. Shop Drawings: Submit door and frame schedule using same reference designations indicated on Drawings. Include opening size(s), handing of doors, frame throat dimensions, details of each frame type, elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, hardware group numbers, details of joints and connections, fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 1. Indicate routing of electrical conduit and dimensions and locations of cutouts in door frames to accept electric hardware devices.
- C. Construction Samples: Submit approximately 18 by 24 inches (450 by 600 mm) construction samples, representing the required construction of door frames for Project.
 - 1. Welded Frames: Show profile, welded corner joint, welded hinge reinforcement, dust-cover boxes, floor and wall anchors, stops, and silencers.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.
- B. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to

comply with design, materials, and construction equivalent to requirements for labeled construction.

1.4 QUALITY ASSURANCE

- A. Hollow Metal Door Frame Standard: Comply with the applicable provisions and recommendations of the following publications by Hollow Metal Manufacturers Association (HMMA) Div. of National Association of Architectural Metal Manufacturers (NAAMM), unless more stringent requirements are indicated in the Contract Documents:
 - 1. HMMA "Hollow Metal Manual."
 - 2. HMMA 861 "Guide Specifications for Commercial Hollow Metal Doors and Frames."
- B. Manufacturer Qualifications: A firm experienced in manufacturing hollow metal doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
 - 1. Provide metal labels permanently fastened on each door frame which is within the size limitations established by the labeling authority having jurisdiction.
 - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
 - 3. Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the Drawings. Installed door assemblies shall be in accordance with door manufacturer's certified assemblies.
 - a. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
- D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver door frames palleted, wrapped, or crated to provide protection during transit and Project site storage.
- B. Inspect door frames, on delivery, for damage. Tool marks, rust, blemishes, and other damage on exposed surfaces will not be acceptable. Remove and replace damaged items as directed by

Architect. Store door frames at building site in a dry location, off the ground, and in such a manner as to prevent deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide doors and frames by one of the following:
 - 1. Hollow Metal Door Frames:
 - a. Ceco Door Products; an Assa Abloy Group Company.
 - b. Curries Company; an Assa Abloy Group Company.
 - c. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, CS (commercial steel), Type B, free from scale, pitting, coil breaks, surface blemishes, buckles, waves, or other defects, exposed (matte) dull finish, suitable for exposed applications.
- B. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled. Not less than 16 gauge, (0.053 inch) (1.3 mm) thick where frames are indicated to be built into exterior walls, hot dip galvanize after fabrication in compliance with ASTM A153/A153M, Class B.
- C. Inserts, Bolts, and Fasteners: Galvanized steel.
 - 1. Expansion Bolts and Shields: FS FF-S-325, Group III, Type 1 or 2.
 - 2. Machine Screws: FS FF-S-92, carbon steel, Type III cross recessed, design I or II recess, style 2C flat head.
- D. Filler: Sound deadening and heat retarding mineral fiber insulating material.
- E. Glass and Glazing: Refer to Section 08 80 00 "Glazing."

2.3 FRAMES

- A. Fabricate hollow metal frames, formed to profiles indicated, with full 5/8 inch (16 mm) stops, and of the following minimum thicknesses.
 - 1. For interior use, form frames from cold- rolled steel sheet of the following thicknesses:
 - a. Openings up to and Including 48 Inches (1200 mm) Wide: 16 gauge (0.053 inch) (1.3 mm).

- b. Openings More Than 48 Inches (1200 mm) Wide: 14 gauge (0.067 inch) (1.7 mm).
- B. Provide frames either saw mitered and full (continuously) profile welded, or machine mitered and full profile welded, on back side at frame corners and stops with edges straight and true. Grind welds smooth and flush on exposed surfaces.
- C. Hardware Reinforcement: Fabricate reinforcements from same material as frame to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.
1. Hinges and Pivots: 7 gauge (0.167 inch) (4.2 mm) thick by 1-1/4 inches (32 mm) wide by 10 inches (254 mm).
 2. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick by size as required by hardware manufacturer.
 3. Closer Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick one piece channel by size as required by hardware manufacturer.
 4. Other Hardware Reinforcements: As required for adequate strength and anchorage.
- D. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.
1. Provide all cutouts and reinforcements required for steel frames to accept security system components.
 2. Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.
 - a. Hinge Location: Center for doors less than 90 inches (2286 mm) tall or second hinge from door bottom for doors greater than 90 inches (2286 mm); top or bottom electric hinge locations shall not be permitted.
- E. Jamb Anchors: Locate jamb anchors above hinges and directly opposite on strike jamb as required to secure frames to adjacent construction. At metal stud partitions locate the additional jamb anchor below the top hinge.
1. Masonry Construction: Adjustable, corrugated or perforated, anchors to suit frame size; formed of same material and gauge thickness as frame; at non-rated frames use friction fit T-shaped anchors, at rated frames use anchors consisting of spot welded strap and adjustable anchor; with leg not less than 2 inches (50 mm) wide by 10 inches (250 mm) long. Furnish at least the number of anchors per jamb according to the following frame heights:
 - a. Two anchors per jamb up to 60 inches (1500 mm) in height.
 - b. Three anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
 - c. Four anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
 - d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.

2. Metal-Stud Partitions: Metal channel stud zee anchor sized to match stud width, welded to back of frames, formed of same material and gauge thickness as frame. Provide at least the number of anchors for each jamb according to the following heights:
 - a. Three anchors per jamb up to 60 inches (1500 mm) in height.
 - b. Four anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
 - c. Five anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
 - d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.
 3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch- (9-mm-) diameter countersunk flat head bolts into expansion shields or inserts 6 inches (150 mm) from top and bottom of each jamb with intermediate anchors spaced a maximum of 26 inches (650 mm) o.c. Soffit face of frame shall be punched and dimpled to accept countersunk bolt head. Reinforce frame with spacer to prevent bowing. Bolt head shall be set slightly below soffit face, filled and ground smooth at time of installation.
- F. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material as frame, 12 gauge (0.093 inch) (2.3 mm) thick, and punched with two holes to receive two 0.375 inch (9.5 mm) fasteners. Where floor fill or setting beds occur support frame by adjustable floor anchors bolted to the structural substrate. Terminate bottom of frames at finish floor surface. Weld floor anchors to frames with at least 4 spot welds per anchor.
- G. Head Strut Supports: Provide 3/8-by-2-inch (9-by-50-mm) vertical steel struts extending from top of frame at each jamb to supporting construction above. Bend top of struts to provide flush contact for securing to supporting construction above by bolting, welding, or other suitable anchorage. Provide adjustable wedged or bolted anchorage to frame jamb members to permit height adjustment during installation. Adapt jamb anchors at struts to permit adjustment.
- H. Head Reinforcement: For frames more than 48 inches (1200 mm) wide in masonry wall openings, provide continuous steel channel or angle stiffener, 12 gauge (0.093 inch) (2.3 mm) thick for full width of opening, welded to back of frame at head. Head reinforcements shall not be used as a lintel or load-bearing member for masonry.
- I. Spreader Bars: Provide removable spreader bar across bottom of frames, attached to jambs and mullions to serve as bracing during shipment and handling and to hold frames in proper position until anchorage and adjacent construction have been completed.
- J. Door Silencer Holes: Drill strike jamb stop to receive three silencers on single door frames and for two silencers on double door frames. Insert plastic plugs in holes to keep holes clear during installation.
- K. Plaster Guards and Removable Access Plates: Provide 26 gauge (0.016-inch-) (0.4-mm-) thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware operation. Provide removable access plates in the heads of frames to receive overhead concealed door closers.

2.4 STOPS AND MOLDINGS

- A. Provide continuous stops and moldings around solid, and glazed, panels where indicated.
- B. Form fixed stops and moldings integral with frame, on the exterior (non-secured) side of the frame.
- C. Provide removable stops and moldings formed of 20 gauge (0.032-inch-) (0.8-mm-) thick steel sheets matching hollow metal frames. Secure with countersunk oval head machine screws spaced uniformly not more than 12 inches (300 mm) o.c. Form corners with butted or mitered hairline joints.
- D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.5 FABRICATION

- A. Fabricate door frames rigid, neat in appearance, and free of defects, warp, wave, and buckle. Accurately form metal to sizes and profiles indicated. Accurately machine, file, and fit exposed connections with hairline joints. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
- B. Exposed Fasteners: Provide countersunk flat heads for exposed screws and bolts, unless otherwise indicated.
- C. Hardware Preparation: Prepare door frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware. Factory-reinforce door frames to receive surface-applied hardware. Factory drill and tap for surface-applied hardware,.
 - 1. Locate hardware as indicated on the Drawings or in Section 08 71 00 "Door Hardware" or, if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

2.6 STEEL SHEET FINISHES

- A. General: Clean, treat and prime surfaces of fabricated steel door frame work, inside and out, whether exposed or concealed in the construction.
- B. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale, shavings, filings, and rust, if present, complying with SSPC-SP 3, "Power Tool Cleaning."

- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.
 - 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install door frames according to the referenced standards, the Architect reviewed shop drawings, and manufacturer's written recommendations and installation instructions.
- B. Frames: Install frames where indicated. Extend frame anchorages below fills and finishes. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.
 - 1. Welded Frames:
 - a. Set masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.
 - 1) Set anchorage devices opposite each anchor location as specified and anchorage device manufacturer's written instructions. Leave drilled holes rough, not reamed, and free of dust and debris.
 - b. Placing Frames: Set frames accurately in position; plumb; align, and brace securely until permanent anchors are set.
 - 1) At concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 2) Anchor bottom of frames to floors through floor anchors with threaded fasteners.
 - 3) Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
 - 4) Remove spreader bars only after frames are properly set and secured.
 - 2. At fire-rated openings, install frames according to NFPA 80.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.
- D. Wood Door Installation: Refer to 08 14 16 "Flush Wood Doors."
- E. Apply hardware in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." Drill and tap for machine screws as required. Do not use self tapping sheet metal screws. Adjust door frame installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
 1. Finish Painting: Refer to Section 09 91 23 "Interior Painting."
- C. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise defective.
- D. Institute protective measures required throughout the remainder of the construction period to ensure that the hollow metal doors and frames will be without damage or deterioration, at time of Substantial Completion.

END OF SECTION 08 12 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid core flush wood doors.
 - 1. The integration of a security system into the flush wood door work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of door required. Include factory-finishing specifications.
 - 1. Submit laboratory test report results of hinge loading, cycle/slam, stile edge screw withdrawals, and stile edge split resistance for fire rated doors.
- B. Shop Drawings: Submit shop drawings indicating location, size, thickness, and hand of each door; elevation of each kind of door; construction details not covered in the product data; location and extent of hardware blocking; undercuts, special beveling, and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware of factory machined doors.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 4. Indicate routing of electrical conduit and dimensions and locations of cutouts in wood doors to accept electric hardware devices.
- C. Samples: Cut away corner section of each door type approximately 8 by 10 inches (200 by 250 mm) demonstrating door construction, face veneer and finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificate of Compliance for Fire Rated Doors: Provide copies of testing agency's Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with the applicable provisions and recommendations of AWI's "Architectural Woodwork Quality Standards Illustrated, 8th Edition, Version 2.0, Section 1300" where standards and specifications conflict the more stringent shall be required.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252, and UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
 - 1. Provide metal labels permanently fastened on each door which is within the size limitations established by the labeling authority having jurisdiction.
 - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
 - 3. Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the Drawings. Installed door assemblies shall be in accordance with door manufacturer's certified assemblies.
 - a. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
 - 4. Provide fire rated door assemblies with smoke and draft control rating at corridors, stairwells, and where required by applicable codes. Sizes and configurations as shown on the Drawings. Installed door assemblies shall be in accordance with door manufacturer's certified assemblies.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in heavy duty cardboard cartons or poly bags.
- C. Handle wood doors with clean gloves. Lift and carry wood doors when moving them around the site, do not drag wood doors across one another.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until wet work , such as masonry, concrete, stone, tile, terrazzo, plastering, wallboard joint treatment, is complete and dried, and HVAC system is operating and will maintain temperature and relative humidity at occupancy

levels during the remainder of the construction period. Do not expose doors to sudden changes in temperature such as forced heat used to dry out the site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship for the life of the original installation of the door. A representative of the door manufacturer shall inspect the installed doors and shall note on the warranty that no provisions of the warranty have been nullified in the manufacture and/or installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance to requirements, provide products by one of the following:
 - 1. Eggers Industries, Architectural Door Division.
 - 2. Marshfield Door Systems, Inc.
 - 3. VT Industries.

2.2 DOOR CONSTRUCTION

- A. General:
 - 1. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain added formaldehyde.
- B. Doors for Transparent Finish:
 - 1. Grade: Premium, with Grade AA faces.
 - 2. Face Veneer Species and Cut: Match existing.
 - 3. Match between Veneer Leaves: Match existing.
 - 4. Assembly of Veneer Leaves on Door Faces: Center balance match.
 - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - 6. Thickness: 1-3/4 inch (45-mm) unless otherwise indicated.
 - 7. Materials:
 - a. Particleboard Core Material: Complying with ANSI A208.1, Grade 1-LD-1 or 1-LD-2.
 - b. Blocking: 5-1/2 inch (138-mm) wide minimum top-rail blocking at doors with closers and bottom rail blocking at doors with kickplates consisting of minimum

- 1/2 inch (13-mm) wide single length structural composite lumber (SCL) outer band and single length SCL inner band.
- c. Vertical Edges: 1-3/8 inch (35-mm) wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Outer band to match face veneer for transparent finished veneered-faced doors. Trim non-rated door width equally on both jamb edges.
 - d. Crossbanding: Minimum 1/16 inch (1.5-mm) thick, low density hardwood, composite, or HDH (high density hardboard).
8. Construction: AWI Section 1300, PC-5 ME. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand cross banding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, crossbanding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.
- C. Doors for Opaque Finish:
1. Grade: Custom.
 2. Face Veneer: Medium-density overlay.
 3. Thickness: 1-3/4 inch (45-mm) unless otherwise indicated.
 4. Materials:
 - a. Particleboard Core Material: Complying with ANSI A208.1, Grade 1-LD-1 or 1-LD-2.
 - b. Blocking: 5-1/2 inch (138-mm) wide minimum top-rail blocking at doors with closers and bottom rail blocking at doors with kickplates consisting of minimum 1/2 inch (13-mm) wide single length structural composite lumber (SCL) outer band and single length SCL inner band.
 - c. Vertical Edges: 1-3/8 inch (35-mm) wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Trim non-rated door width equally on both jamb edges.
 - d. Crossbanding: Minimum 1/16 inch (1.5-mm) thick, low density hardwood, composite, or HDH (high density hardboard).
 5. Construction: AWI Section 1300, PC-5 CE. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, crossbanding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.
- D. Fire Rated Door Construction:

1. Construction: AWI Section 1300, FD-5, with particleboard or mineral core as required to provide fire rating indicated, and faced to match non-rated fire doors. Provide required label(s) on each door.
 2. Blocking: For mineral-core doors, provide composite blocking, of same thickness as core, approved for use in doors of fire ratings indicated, and as follows:
 - a. 5-1/2 inch (138-mm) wide minimum top-rail blocking consisting of minimum 1/2 inch (13-mm) wide single length mill option hardwood outer band and single length lumber inner band fabricated of same materials as vertical edges.
 - b. Provide either two 4-1/2 inch (114-mm) by 18 inch (457-mm) minimum sized lock blocks on each door stile or a single 10 inch (254-mm) high continuous lock rail located on lockcase body centerlines.
 3. Vertical Edge Construction: Provide manufacturer's standard laminated-edge construction meeting label requirements, with intumescent seals concealed by outer stile matching face veneer, and meeting or exceeding the specified direct screw withdrawal, split resistance, cycle slam, and hinge loading criteria. Finish outer bands to match door faces without joints.
 - a. Split Resistance: Not less than 696 pounds when tested in accordance with WDMA TM-5; or, not less than 1305 pounds when tested in accordance with ASTM D 143.
 - b. Cycle/Slam: Not less than 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with the requirements of WDMA TM-7; or, not less than 502,000 cycles when tested in accordance with ANSI A151.1
 - c. Direct Screw Withdrawal: Not less than 700 pounds when tested in accordance with WDMA TM-10; or, not less than 877 pounds when tested in accordance with ASTM D 1037 using #12 x 1-1/4 steel screws, threaded to the head with either A or AB wood threads.
 - d. Hinge Loading: Not less than 684 pounds average when tested in accordance with WDMA TM-8.
 4. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.
 5. Thickness: 1-3/4 inch (45-mm) unless otherwise indicated.
- E. Wood Beads for Light Openings in Wood Doors: Manufacturer's standard flush designed, solid wood, rectangular shaped, back beveled or quirked, beads matching veneer species of door faces. Include glazing compounds or tapes sized for back bevel or quirk provided. Include finish nails for removable stops sized in accordance with wood door manufacturer's recommendations.
- F. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include glazing compounds or tapes and concealed metal glazing clips for opening size and fire rating indicated. Include finish nails for removable stops sized as required for fire rating indicated.

2.3 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 unless otherwise indicated to match existing frame hardware preparations. Comply with final hardware schedules, door frame Shop Drawings, AWI Section 1300-G-20, BHMA A156.115-W standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required. Install light beads with fasteners spaced for opening size and fire rating indicated. Install wood bead moldings with finish nails and countersink without striking bead. Fill countersunk heads with putty matching wood bead color.

2.4 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces and edges of doors, including cutouts, with one coat of wood primer/sealer as standard with door manufacturer. Surfaces shall be clean and dry before priming. Apply primer/sealer uniformly without bare spots, runs, or sags.

2.5 FACTORY FINISHING

- A. General: Finish doors at factory that are indicated to receive transparent finish.
- B. Grade: Premium.
- C. Finish: Manufacturer's standard finish with performance meeting or exceeding either AWI System TR-4 conversion varnish or AWI System TR-6 catalyzed polyurethane.
- D. Staining: Prepare door faces, stiles, rails, and cutouts, with toners, or stains, prior to the application of finish to match Architect's sample.
- E. Effect and Sheen: Match Architect's sample.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: Apply hardware to new doors in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." For particleboard core doors drill pilot holes of proper size for installing hinge screws. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
 - 1. Factory wrapping shall be maintained on new doors during construction period, and all hardware shall be installed by cutting the factory wrapping at the mounting location of the hardware item.
- B. General Door Installation Standards: Install doors in locations indicated to comply with manufacturer's written instructions, referenced quality standard, and as indicated. Where standards conflict the more stringent shall apply.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to fire label requirements.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge, matching clearances specified for factory prefabrication, and to contact stops uniformly. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner.
 - 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- E. Field-Finished Doors: Refer to the following for finishing requirements:
 - 1. Section 09 91 23 "Interior Painting."

3.2 ADJUSTING AND PROTECTION

- A. Rehang or replace doors that do not swing or operate freely.
- B. Protection: Protect wood doors to ensure that the wood door work will be without damage or deterioration at the time of Substantial Completion.
 - 1. Refinish or replace wood doors damaged during installation. Replace any new wood doors that are warped, twisted, demonstrate core show through, are not true in plane, or cannot be refinished to the satisfaction of the Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes access doors and frames.

1.2 COORDINATION

- A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and where shown on the drawings, and indicate on schedule specified in "Submittals" Article.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of access door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
 - 1. Method of attaching door frames to surrounding construction.
 - 2. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.
- B. Schedule: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors of each type for entire project from one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 and that are labeled and listed by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction per test method indicated.
 - 1. Vertical Access Doors: NFPA 252 or UL 10B.

- C. Size and Location Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule.

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.

2.2 ACCESS DOORS AND FRAMES

- A. Flush, Insulated, Fire-Rated Access Doors and Trimless Frames : Fabricated from steel sheet.

1. Locations: Gypsum board wall surfaces indicated to be fire rated.
2. Fire-Resistance Rating: One and one-half hours.
3. Temperature Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal.
5. Frame: Sheet metal with drywall bead.
6. Hinges: Continuous piano hinge.
7. Automatic Closer: Spring type.
8. Latch: Self-latching bolt operated by knurled knob with interior release.
9. Products: One of the following:
 - a. Acudor Products, Inc.; FW-5050-DW Fire Rated for Drywall - Insulated.
 - b. Larsen's Industries, Inc.; L-FRAP.
 - c. Milcor; Style UFR-DW.
 - d. Nystrom, Inc.; IW Series.

- B. Flush Access Typical Doors and Trimless Frames for Vertical Surfaces : Fabricated from steel sheet.

1. Locations: Gypsum board wall surfaces.
2. Door: Minimum 14 gauge 0.067 inch (1.7 mm) thick sheet metal, set flush with surrounding finish surfaces.
3. Frame: Minimum 16 gauge 0.053 inch (1.3 mm) thick sheet metal with drywall bead.
4. Hinges: Continuous concealed type.
5. Latch: Flush, screwdriver- operated cam latch of number required to hold door in flush, smooth plane when closed.
6. Products: One of the following:
 - a. Acudor Products, Inc.; DW-5040 Flush for Drywall.
 - b. Larsen's Industries, Inc.; Model L-DWC.
 - c. Milcor; Style DW.
 - d. Nystrom, Inc.; NW Series.

- C. Flush Access Typical Doors and Trimless Frames for Horizontal Surfaces : Fabricated from glass fiber reinforced gypsum.
1. Locations: Gypsum board ceiling surfaces.
 2. Door: Minimum 1/8 inch (3 mm) thick glass fiber reinforced gypsum, set flush with surrounding gypsum wallboard finish surfaces.
 3. Frame: Minimum 1/8 inch (3 mm) thick glass fiber reinforced gypsum, with tapered square edge.
 4. Hinges and Latch: None, lay-in manual push up type.
 5. Product:
 - a. Acudor Products, Inc.; GFRG Recessed Access Door for Drywall Ceilings.
 - b. Chicago Metallic Ceiling Systems and Specialty Products: Glass Reinforced Gypsum Drywall Ceiling Access Doors.
 - c. Formglas, Inc.: Interior Ceiling Access Panel.
 - d. IntexForms Inc.; Series AP Access Panel.
 - e. Wind-Lock; Stealth Access Panels.
- D. Flush Access Doors and Frames with Exposed Trim : Fabricated from steel sheet.
1. Locations: Ceramic-tile wall surfaces.
 2. Door: Minimum 14 gauge (0.067 inch) (1.7 mm) thick sheet metal, set flush with exposed face flange of frame.
 3. Frame: Minimum 16 gauge (0.053 inch) (1.3 mm) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
 4. Hinges: Continuous piano hinge.
 5. Latch: Flush, screwdriver-operated cam latch of number required to hold door in flush, smooth plane when closed.
 6. Products: One of the following:
 - a. Acudor Products, Inc.; UF-5000 Universal Flush Access Door.
 - b. Larsen's Industries, Inc.; Model L-MPG.
 - c. Milcor; Style M.
 - d. Nystrom, Inc.; NT Series.

2.3 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Steel Access Doors: Fabricate units of continuous welded steel construction. Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
1. Provide special sized access doors where required or requested.
- C. Glass Fiber Reinforced Gypsum Doors: Fabricate units of monolithic glass fiber reinforced gypsum construction having a shell thickness of between 1/8 to 3/16 inch (3 to 4.8 mm) and

weighing approximately 2 pounds per square foot. Edges of doors shall be rabbetted to overlap and rest on the frame.

1. Provide special sized access doors where required or requested.

D. Frames:

1. Exposed Flanges: Nominal 1 to 1-1/2 inches (25 to 38 mm) wide around perimeter of frame for steel frames.
2. Provide trimless carbon steel frames with drywall bead for installation in gypsum wallboard assembly, furnish perforated frames with drywall bead, securely attached to perimeter of frames, in size to suit thickness of gypsum panels indicated. Provide mounting holes in frames to attach frames to metal framing in drywall construction.
3. Provide trimless glass fiber reinforced frames with tapered edges for taping and joint compound installation into gypsum wallboard ceiling assembly, in size to suit thickness of gypsum panels used.

2.4 CARBON STEEL FINISHES

- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors. Coordinate installation with work of other trades.
- B. Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- C. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- D. Install access doors flush with adjacent finish surfaces or recessed to receive finish material.
- E. Adjust doors and hardware after installation for proper operation.
- F. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes door hardware.

1.2 PRE-INSTALLATION MEETINGS

- A. Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Address for delivery of keys.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - 2. Review sequence of operation for each type of electrified door hardware.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review required testing, inspecting, and certifying procedures.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data including installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: Submit samples of exposed door hardware for each type indicated below, in specified finish. Tag with full description for coordination with the Door Hardware Schedule.
 - 1. Door Hardware: As follows:
 - a. Locks and latches.
 - b. Operating trim.

2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- C. Door Hardware Schedule: Submit door hardware schedule prepared by or under the supervision of door hardware supplier. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. The Architect's review of schedule shall neither be construed as a complete check nor shall it relieve the Contractor of responsibility for errors, deviations, or omissions from the specified requirements to provide complete door hardware for the project.
1. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule.
 2. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware. Supply templates to door and frame manufacturer(s) to enable proper and accurate sizing and locations of cutouts for hardware. Detail conditions requiring custom extended lip strikes, or other special or custom conditions.
 - g. Door and frame sizes and materials.
 - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
- D. Keying Schedule: Submit keying schedule prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance data for each type of door hardware. Include final hardware and keying schedule.
- B. Warranties: Submit special warranties specified in this Section.

- C. Fire-Rated Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Supplier Qualifications: Door hardware supplier, who has completed a minimum of three projects over the last five years which were similar in material, design and extent to that indicated for the project and which have resulted in construction with a record of successful in service performance, and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer, unless otherwise indicated.
- D. Regulatory Requirements: Comply with the following:
 - 1. Provide hardware items complying with the applicable provisions for accessibility and usability by the disabled and handicapped in compliance with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, and Texas Accessibility Standards (TAS).
 - 2. NFPA 101: Comply with applicable provisions for means of egress doors.
 - 3. Electrified Door Hardware: Listed and classified by Underwriters Laboratories, Inc. or by a testing agency acceptable to authorities having jurisdiction, as suitable for the purpose indicated.
- E. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by Underwriters Laboratories, Inc. for fire ratings indicated, based on testing according to NFPA 252. Provide only door hardware items that are identical to items tested by UL for the types and sizes of doors required. In case of conflict between type of hardware specified and type required for accessibility or fire protection, furnish type required by NFPA and UL. Doors indicated in fire rated partitions and walls shall be positive latching and self-closing, with smoke gaskets where required by applicable codes.
 - 1. Wherever exit device hardware is required on doors, comply with UL 305. Furnish hardware to door manufacturer for installation at factory. Provide supplementary label, "Fire Exit Hardware," on each exit device to certify that panic hardware has been panic load tested with door.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.7 COORDINATION

- A. Coordinate layout and installation of recessed pivots and closers with floor construction.
- B. Templates: Furnish templates and door hardware schedules, coordinated for the application of door hardware items with door and frame details, to door opening fabricators and trades performing door opening work to permit the preparation of doors and frames to receive the specified door hardware. Where the door hardware item scheduled is not adaptable to the finished size of door opening members requiring door hardware, submit an item having a similar operation and quality to the Architect for review. Each door hardware item shall be fabricated to templates.
- C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to, power supplies, fire alarm system and detection devices, access control system, security system, building control system.
- D. 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.

1.8 WARRANTY

- A. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Faulty operation of door hardware.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal use.
- B. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.
- C. Warranty Period for Other Hardware: Two years from date of Substantial Completion.
- D. Warranty for Mortised Mechanical Lock and Latchsets: Ten years from date of Substantial Completion.
- E. Warranty for Heavy Duty Cylindrical Mechanical Lock and Latchsets: Seven years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets are keyed to each scheduled door in the door and frame schedule, and the Door Hardware Schedule on Drawings.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products.
 2. The hardware supplier shall review each hardware set and compare it with the door types, details, and sizes as shown and verify each hardware item for function, hand, backset, and method of fastening through shop drawing submittals.

2.2 HINGES AND PIVOTS

- A. Butt Hinge Products and Manufacturers:
1. Standard Weight, Plain Bearing, 5 Knuckle, Steel: Complying with BHMA A156.1 A8133, one of the following:
 - a. 5000; Bommer Industries, Inc., (BI).
 - b. 1279; Hager Companies (HAG).
 - c. T2714; McKinney Products Company (MCK).
 - d. F179; Stanley Commercial Hardware (STH).
 - e. 5PB1; Ives (IVS).
 2. Standard Weight, Ball Bearing, 5 Knuckle, Steel: Complying with BHMA A156.1 A8112, one of the following:
 - a. BB5000; Bommer Industries, Inc., (BI).
 - b. BB1279; Hager Companies (HAG).
 - c. TA2714; McKinney Products Company (MCK).
 - d. FBB179; Stanley Commercial Hardware (STH).
 - e. 5BB1; Ives (IVS).
- B. General Hinge and Pivot Characteristics: Where door jamb or trim projects to such an extent that the width of leaf specified will not allow the door to clear such frame or trim, furnish hinges and pivots with leaves of sufficient width to clear. Hinges and pivots shall be template hinges conforming to BHMA A156.1 and in accordance with door and frame material requirements.
1. Pivot Hinge Special Layout: At deep reveals where door frame profiles will not permit the use of a standard top pivot (e.g. deep reveals, narrow frames, full height doors) furnish top pivots less top leaf with specially designed and fabricated pivot block (Rixson Special Layout 102).

2. Pivot Hinge Special Layout: Where door frame and door face profiles are flush and will not permit the use of a standard 3/4 inches (19 mm) offset top pivot furnish top pivots with 1-1/2 inches (38 mm) offset top pivot jamb portion (Rixson Special Layout SP 1124 1-1/2").
- C. Butt Hinge and Offset Pivot Hinge Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to and including 60 inches (1524 mm).
 2. Three Hinges: For doors with heights of greater than 60 inches (1524 mm) to and including 90 inches (2286 mm).
 3. Four Hinges: For doors with heights greater than 90 inches (2286 mm) to and including 120 inches (3048 mm).
 4. Provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).
- D. Butt Hinge Sizes: 4-1/2 inches (114 mm) h. x 4 inches (102 mm) or 4-1/2 inches (114 mm) w. for doors up to and including 36 inches (914 mm) in width; 5 inches (127 mm) h. x 4 inches (102 mm) or 4-1/2 inches (114 mm) w. for doors greater than 36 inches (914 mm) in width.
- E. Hinge Characteristics: Full mortise type with square corners. All butt hinges are to have non-rising pins. Provide only steel bodied butt and pivot hinges at labeled doors. All butt hinges shall be furnished with button tips. Provide heavy weight, ball bearing, hinges at doors 40 inches (1016 mm) and greater in width.
- F. Electrified Functions for Hinges and Pivots: Furnish fully concealed circuit, tamper resistant, wired hinges and pivots at doors requiring power transfer or door monitoring from jamb to door. All electrified hinges and pivots shall be rated for the in-rush amperage of the door mounted device being electrified. Provide each electrified hinge with leads of a length sized to properly tie to door mounted electro-mechanical locking devices.
- G. Fasteners: Package all hinges and pivots with machine and wood screws as required by door and frame construction.

2.3 LOCKS AND LATCHES

- A. Mortise Lock and Latch Sets: Heavy duty, commercial, mortise bodies complying with BHMA A156.13 Series 1000, Grade 1, with throughbolted lever trim. Furnish mortise type, field reversible without disassembly, field multifunctional without opening lock cases, lock and latch sets with 1 or 2 piece anti-friction deadlocking stainless steel latchbolts having a minimum 3/4 inch (19 mm) throw, 2-3/4 inches (70 mm) backset, and UL listed for 3 hour doors. All lock and latch sets, to be furnished complete with heavy 0.109 inch (2.77 mm) (12 gage) wrought steel zinc dichromate or chrome plated case, trim, adjustable beveled square cornered armored fronts, cold forged steel or stainless steel hubs, and 6 pin cylinders. Conceal fastenings, washers and bushings. Provide wrought, or black plastic, box strikes for each lock and latch set. Provide brass, bronze or stainless steel strikes with curved lips of sufficient length to protect frames. Provide solid forged or cast levers with wrought roses. Where electro-mechanical locksets are scheduled provide transformers properly sized for conversion of power

supply to the power characteristics of the electromechanical locksets. Where electro-mechanical locksets are scheduled provide request to exit (REX) monitoring feature.

1. Sargent 8200 Series, design and lever trim as indicated; Sargent Manufacturing Company (SGT). Provide handed ANSI 4-7/8" curved lip strikes die punched to match bolts provided with latchset functions only, provide non-handed standard curve lip strikes 82-0110 for all other functions. Where electro-mechanical locksets are scheduled provide 8270 Series with trim matching mechanical locksets.
- B. Interior Door and Wall Mounted Card Readers and Locksets: A magstripe type card hotel locking system that utilizes a stand-alone battery powered (9 volt alkaline) door unit for interior and exterior use.
 1. Basis of Design: As indicated in Hardware Schedule on Drawings.
- C. Rabbeted Doors: Provide special rabbeted front and strike on locksets for rabbeted meeting stiles.

2.4 DOOR BOLTS

- A. Manual Surface Bolts: Provide 12 inch (304.8 mm) surface mounted slide bolts UL Listed for A labeled metal fire doors and complying with BHMA A156.16, Type 84161. Furnish manufacturer's standard guide brackets and strikes for conditions indicated.
 1. 1012F; Door Controls International (DCI).
 2. SB453-12; Ives (IVS).
- B. Manual Flush Bolts: Provide flush bolts, with 1 inch (25.4 mm) wide fronts, in paired sets (top and bottom), with 1/2 inch (12.7 mm) diameter flattened bolt tip for both wood and metal doors and standard 12 inch (304.8 mm) rod at flushbolts for metal doors. Flush bolts shall fit ANSI A115.4 door and frame preparation. Bolts to comply with BHMA A156.16, Type L14081, L14251, L04261 or L24081. Furnish rods of proper length to afford easy reach from the floor. Furnish manufacturer's standard top strikes for top bolts.
 1. Manual Flushbolts for Wood Doors: One of the following:
 - a. No. 790F; Door Controls International (DCI).
 - b. FB358; Ives (IVS).
 - c. 3913; Trimco Hardware (TBM).
 2. Manual Flushbolts for Metal Doors: One of the following:
 - a. No. 780F; Door Controls International (DCI).
 - b. FB458; Ives (IVS).
 - c. 3917; Trimco Hardware (TBM).
- C. Self-Latching Flush Bolt Assemblies for Metal Fire Doors: BHMA A156.3, Type 27; one of the following:

1. No. 845 (805 top bolt x 840 automatic bottom bolt); Door Controls International (DCI).
2. FB51P (FB51T constant latching top bolt x FB31B automatic bottom bolt; Ives (IVS).
3. 3820 (3820 x 3810); Trimco Hardware (TBM).

D. Self-Latching Flush Bolt Assemblies for Wood Fire Doors: BHMA A156.3, Type 27; one of the following:

1. No. 945 (905 top bolt x 940 automatic bottom bolt); Door Controls International (DCI).
2. FB41P (FB41T constant latching top bolt x FB41B automatic bottom bolt; Ives (IVS).
3. 3825L (3825L x 3815L); Trimco Hardware (TBM).

2.5 CYLINDERS AND KEYING

A. Cores for Bored Cylindrical Locksets: Provide key-in lever 6 pin cores for all bored cylindrical locksets, keyed into base building system, as manufactured by the bored lockset manufacturer.

B. Cylinders: Full faced cylinders with square shouldered (not tapered) compression rings, 6 pin cylinders, standard threaded, keyed into building system, with cams to suit lock functions. Provide cylinders for installation into all locks.

1. 1100 Series Flexible Head Mortise Cylinder; Corbin Russwin Architectural Hardware (CR).
2. Series 40 Adjustable Front Cylinder; Sargent Manufacturing Company (SGT).
3. 30-001 full-faced mortised cylinder with 36-083 compression rings; Schlage Lock Company (SCH).
4. 1E Series with Straight Rings ; Stanley Security Solutions.

C. Keying System: Final keying to determine lock cylinders, keyed alike sets, level of keying, master key groups, grandmaster keying system shall be as directed by the Owner. Supplier and Contractor shall meet with the Owner and obtain final instructions in writing. Provide two nickel silver keys for each lock, and six keys for each grandmaster and masterkey system. Provide two blank keys for each lock for the Owner's convenience in making additional keys.

1. Temporary Cylinders: Provide temporary cylinders in locks during construction and as may be necessary for security or as may be requested by the Owner. All temporary cylinders shall be individually keyed as required and subject to a single master key.

D. Key Control System: Furnish a key control system with complete accessories including key gathering envelopes, labels, reserve pattern key tags with self-locking key clips, key receipt forms, key receipt holders, 3-way visible card index, temporary key markers and permanent key markers.

2.6 STRIKES

A. Strikes for Locks and Latches: All strikes for locks and latches shall be provided by the lock and latch manufacturer unless otherwise specified or scheduled, refer to Article 'Locks and Latches.'

- B. Dustproof Floor Strikes: Complying with BHMA A156.16, Type L04251, L04021 or L14021, one of the following:
1. No. 80; Door Controls International.
 2. DP2; Ives.
 3. 3910; Trimco Hardware (TBM).

2.7 ACCESSORIES FOR PAIRS OF DOORS

- A. Tubular Coordinators and Filler Bars: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21A. Provide with filler piece of length as required to close the header area and mounting brackets at stop mounted hardware. Furnish extenders at active leaf levers where required to clear overlapping astragals on doors installed with pocket pivot hinges or jambs with deep jamb stops.
1. No. 600 Series x Filler Bar; Door Controls International (DCI).
 2. COR Series Coordinators x FL filler; Ives (IVS).
- B. Coordinator Brackets: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21B. Minimum 7-inch (178-mm) projection.
1. No. 500 Coordinator; Door Controls International (DCI).
 2. CORG7; Ives (IVS).
- C. Carry Open Bars: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21. Provide carry-open bars for inactive leaves of pairs of doors, unless automatic or self-latching bolts are used.
1. No. CB Carry Bar; Door Controls International (DCI).
 2. CB1 Carry Bar; Ives (IVS).
- D. Astragals: UL listed for use on labeled doors, surface applied continuous extruded aluminum minimum 7/8 inch wide retaining EPDM gaskets for installation on both sides of all meeting stiles of doors:
1. 125NA; National Guard Products, Inc. (NGP).
 2. 305CN; Pemko Manufacturing Co., Inc. (PEM).
- E. Lock Protectors: Fabricated from heavy gauge metal and in finish as scheduled. Furnish protectors sized to cover the latch bolt area of the door and lock and narrow enough to clear rose and escutcheon lock trims, offset formed to clear strike projection. Machine lock protectors where required to accommodate rose and escutcheon trims, and cylinders.
1. LG Series Lock Guards; H. B. Ives (IVS).

2.8 CLOSERS

- A. Surface-Mounted Closers with Track Arms: Closers shall be certified by ETL laboratories and the manufacturer to a minimum of 8,000,000 cycles and meet BHMA A156.4, Grade 1. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, exposure to weather, and anticipated frequency of use. Closers shall have adjustable spring power, full rack and pinion, independent closing speed and latch regulating V-slotted valves, fully hydraulic with a high strength cast iron cylinder and solid forged steel arms, bore diameter of 1-1/2 inches (38.1 mm), pinion shaft diameter of 5/8 inches (15.87 mm), adjustable back check, cushion and built-in stop feature where scheduled, hold open arms where scheduled, delayed action where scheduled, arm finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer.
1. 4011T; LCN Closers (LCN).
 2. 281 with Track Arm; Sargent Manufacturing Company (SGT).
- B. Surface-Mounted Closers Without Track Arms : Closers shall be certified by ETL laboratories and the manufacturer to a minimum of 8,000,000 cycles and meet BHMA A156.4, Grade 1. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Closers shall have adjustable spring power, full rack and pinion, independent closing speed and latch regulating V-slotted valves, fully hydraulic with a high strength cast iron cylinder and solid forged steel arms, bore diameter of 1-1/2 inches (38.1 mm), pinion shaft diameter of 5/8 inches (15.87 mm), adjustable back check, cushion and built-in stop feature where scheduled, hold open arms where scheduled, delayed action where scheduled, arm finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer.
1. 4110/4010; LCN Closers (LCN).
 2. 281; Sargent Manufacturing Company (SGT).
- C. Overhead Concealed Closers, Butt and Offset Hung: Closers shall meet BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturer's standard cover plate finished to match exposed portions of butts or pivots provided.
1. 2010/2030; LCN Closers (LCN).
 2. RTS 88 Series, Offset Slide Arm; Dorma.
- D. Overhead Concealed Closers, Center Hung: Closers shall meet BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply

with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturer's standard cover plate finished to match exposed portions of pivots provided. Provide with manufacturer's standard top arm and pivot to suit conditions indicated.

1. 6030; LCN Closers (LCN).
2. RTS 88 Series, End Loaded Arm; Dorma.

2.9 STOPS AND HOLDERS

- A. Angle Stops: Special angle stop, fabricated from brass or bronze, for single or pairs of doors without stops and having either a single continuous formed sponge silencer or a minimum of two rubber silencers per stop, minimum 1-1/2 inches (38 mm) wide x 3 inches (76 mm) long base for mortising into the head of door frame, minimum 3/4 inch (19 mm) maximum stop face projection; finish as scheduled.
1. AS18 Angle Stop; Ives (IVS).
 2. 1801 Angle Stop; Architectural Builders Hardware Mfg., Inc. (ABH).
- B. Roller Latch Angle Stops: Special angle stop BHMA A156.16 Type E19111, fabricated from brass or bronze, for single doors without stops and having a minimum of two rubber silencers per stop, minimum 1-1/2 inches (38 mm) wide x 4-1/2 inches (114 mm) long base for mortising into the head of door frame, 9/16 inch (14 mm) maximum stop face projection, adjustable roller latch and ramp roller strike; finish as scheduled.
1. 4040 Adjustable Roller Latch; Door Controls International (DCI).
 2. RL1152; Ives (IVS).
 3. 1559BL; Trimco Hardware (TBM).
- C. Roller Latches: Special roller latch complying with BHMA A156.16 Type E19101, fabricated from brass or bronze, for single doors, minimum 1 inch (25 mm) wide x 3-3/8 inches (86 mm) long base for mortising into the head door frame, adjustable nylon covered roller latch and ramp roller strike; finish as scheduled.
1. 4030 Adjustable Roller Latch; Door Controls International (DCI).
 2. RL30; Ives (IVS).
 3. 1559WA; Trimco Hardware (TBM).
- D. Ball Type Latches: 4-way adjustable ball catch complying with BHMA A156.9 Type B13292, fabricated from brass or bronze, for single doors, with two adjustable stainless steel balls held under adjustable spring tension and hook strike.
1. CL21A; Ives (IVS).
- E. Concealed Overhead Door Holders: Heavy duty, concealed mounting, full mortised, bronze bodied, slide track design, with heavy shock absorber spring providing 5 to 7 degree compression before deadstop, non-metal slide and shock blocks, 110 degree maximum opening,

complying with BHMA A156.8 Type C11511 for hold open and Type C11541 for stop function. Provide stop, or hold open, functions as scheduled.

1. 1000 Series; Architectural Builders Hardware Mfg., Inc. (ABH).
2. 100 Series; Glynn-Johnson (GJ).
3. Checkmate Heavy Duty 1 Series; Rixson-Firemark, Inc. (RIX).

F. Exposed Overhead Door Holders: Heavy duty, surface mounted, bronze bodied, slide track design, with heavy shock absorber spring providing 5 to 7 degree compression before deadstop, non-metal slide and shock blocks, 110 degree maximum opening, complying with BHMA A156.8 Type C12511 for hold open and Type C12541 for stop function. Provide stop, or hold open, functions as scheduled.

1. 9000 Series; Architectural Builders Hardware Mfg., Inc. (ABH).
2. 90 Series; Glynn-Johnson (GJ).
3. Checkmate Heavy Duty 9 Series; Rixson-Firemark, Inc. (RIX).

G. Floor Stops: Cast half dome design with rubber bumper, finish as scheduled. Provide manufacturer's standard riser heights as required for carpeted areas in conjunction with the floor bumpers scheduled. Unless otherwise scheduled, provide floor stops at each door leaf where partition construction does not allow the door to swing greater than 90 degrees.

1. For Thresholds, Carpet and/or Undercut Doors: Comply with BHMA 156.16 Type L12161, L02161 or L12141.
 - a. 3320X; Door Controls International (DCI).
 - b. FS438; Ives (IVS).
 - c. 1211; Trimco Hardware (TBM).
2. For Doors with Standard 3/8 inch (9.5 mm) Clearance: Comply with BHMA 156.16 Type L12161, L02141 or L12141.
 - a. 3310X; Door Controls International (DCI).
 - b. FS436; Ives (IVS).
 - c. 1210; Trimco Hardware (TBM).
3. For Acoustical Doors: A security type door stop, molded from black flame resistant resilient material wrapped around a heavy duty threaded steel stud for grouting into the floor substrates, approximately 1-1/2 inch (38 mm) tall x 2 inch (50.8 mm) diameter x 2-1/2 inch (63.5 mm) stud length.
 - a. FS18S; Ives.
 - b. 1209; Trimco Hardware (TBM).
 - c. 269F; Hager Companies (HAG).

H. Silencers for Wood Door Frames: BHMA A156.16, Type L03021; grey rubber. Provide two silencers for each pair of doors, three silencers for each single door.

- I. Silencers for Metal Door Frames: BHMA A156.16, Type L03011; grey rubber. Provide two silencers for each pair of doors, three silencers for each single door.
- J. Silencers for Aluminum Door Frames: Refer to Section 08 12 16 "Interior Aluminum Frames."
- K. Wall Stops: Cast disc type with concave rubber bumper, having a minimum of 2-1/8 inch (54 mm) diameter base with nominal 1 inch (25 mm) projection and concealed attachment to substrate. Unless otherwise scheduled, provide wall stops at each door leaf where partition construction does not allow the door to swing greater than 90 degrees.
 - 1. For Attachment to Masonry: Complying with BHMA A156.16, Type L12251 or L12101.
 - a. WS401CCV; Ives (IVS).
 - b. 1270CV; Trimco Hardware (TBM).
 - 2. For Attachment to Gypsum Wallboard: Complying with BHMA A156.16, Type L12251 or L12101.
 - a. WS402CCV; Ives (IVS).
 - b. 1270WV; Trimco Hardware (TBM).
- L. Magnetic Catches: Aluminum bodied extra heavy duty magnetic catch with outside dimensions of approximately 13/16 x 3-1/8 x 1 inch (20.63 x 79.37 x 25 mm) complying with BHMA A156.9, Type B03161 fabricated with self aligning magnets and furnished complete with door strikes.
 - 1. 327; Ives (IVS).
 - 2. CD45 Double Magnetic Cabinet Catch; Stanley Commercial Hardware (STH).

2.10 SLIDING DOOR HARDWARE

- A. As indicated in hardware Schedule.

2.11 FABRICATION

- A. Manufacturer's Nameplate: Provide each door hardware item without exposed manufacturer's labels, names, or designs.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips oval-head screws with finished heads to match surface of door hardware item being attached. Machine screws and expansion shields shall be used for attaching hardware to concrete and masonry. Use throughbolts for renovation work only where existing door blocking and reinforcements are unknown.

1. Concealed Fasteners: All new doors and door frames have been specified with adequate blocking and reinforcement provisions to eliminate exposed throughbolting of hardware items. Doors installed with exposed throughbolts will be rejected and replaced by the Contractor at no cost to the Owner. Where through bolts are used on existing doors provide sleeves for each through bolt.

2.12 FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Appearance of Finished Work: Finishes of the same designation, that come from two or more sources, shall match when the items are viewed at arm's length and approximately 24 inches (610 mm) apart. Unless otherwise scheduled, match each hardware item in a single hardware set with the scheduled latch or lock set finish. Painting of BHMA 600 (USP) surfaces is required and is specified under Section 09 91 23 "Interior Painting."
- C. Designations: The abbreviations used to schedule hardware finishes are generally BHMA (Federal Standards where indicated in parenthesis) designations. Comply with base material and finish requirements indicated by the following:
 1. BHMA 613 (US10B): Dark-oxidized satin bronze, oil rubbed.
 2. BHMA 626 (US26D): Satin chromium plated.
 3. BHMA 630 (US32D): Satin stainless steel.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Hardware for fire door assemblies shall be installed in accordance with NFPA 80. Hardware for smoke and draft control door assemblies shall be installed in accordance with NFPA 105. Install hardware for non-labeled and non-smoke and draft door assemblies in accordance with BHMA A156.115 for steel doors and frames, BHMA A156.115-W series for wood doors, and hardware manufacturer's installation instructions for doors and frames fabricated from other than steel or wood.
 1. All modifications to fire doors and frame for electric and mortised hardware shall be made by the respective door and frame manufacturers.
- B. Smoke Seals at S Labeled Door Assemblies: Provide and install smoke seals at S labeled doors in accordance with door manufacturer's instructions.

3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at the following heights, unless specifically indicated on the Drawings or required to comply with governing regulations:

1. Locks and Latches: 38 inches (956 mm) to center of lever from finish floor.
 2. Door Pulls: 44 inches (1118 mm) from finish floor to center of grip. Pull bases centered on door stiles, unless otherwise indicated.
 3. Door Pulls: Pull bases centered on top and bottom door rails, and spaced from lock edge of door stile as indicated, or recommended, by the pull manufacturer.
 4. Push Plates: 44 inches (1118 mm) from finish floor to center of plate. Coordinate with pull location.
 5. Horizontal Push/Pull Bar: 42 inches (1067 mm) from finish floor to center of pull/pull. Push/Pull bases centered on door stiles, unless otherwise indicated.
 6. Butt Hinges: 10 inches (254 mm) to bottom of lowest hinge from finish floor; 5 inches (127 mm) to top of upper hinge from top of door; space intermediate hinges equally between lower and upper hinges.
 7. Deadbolts: Not more than 44 inches (1118 mm) from finish floor to operating trim.
 8. Flush Bolt Operating Mechanisms: Top bolt 66 to 72 inches (1676 to 1829 mm) from finish floor, bottom bolt 12 inches (305 mm) from finish floor.
 9. Exit Devices: 40 inches (1016 mm) from finish floor to center of touch bar. 38 inches (965 mm) from finish floor to center of cross bar.
 10. Coat Hooks: 48 inches (1200 mm) from finish floor to center of coat hook.
- B. Install each door hardware item to comply with manufacturer's written instructions. Install overhead surface closers for maximum degree of opening obtainable. Place on room side of corridor doors, stair side of stair doors, secondary corridor side of doors between corridors. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be finished, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. All wall stops shall be installed with reinforced blocking in wallboard construction. Drywall anchors are not an acceptable means of reinforcement/blocking. Provide intermediate steel plates or channel reinforcement backing at wall stops mounted in wallboard construction.
- C. Do not install permanent key cylinders in locks until the time of preliminary acceptance by the Owner. At the time of preliminary acceptance, and in the presence of the Owner's representative, permanent key all lock cylinders. Record and file all keys in the key control system, and turn system over to Owner for sole possession and control.
- D. Key control storage system shall be installed where directed by the Owner.

3.3 ADJUSTING

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every hardware component. Replace hardware components that cannot be adjusted to operate as intended. Adjust door control devices to compensate for building stack pressures, final operation of forced air mechanical equipment and to comply with referenced accessibility requirements.

1. Test each electrical hardware item to determine if devices are properly functioning. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in wiring shall be eliminated.
 2. Coordinate with electrical installation for interface and connection with life safety and security systems.
- B. Fire-Rated Door Assembly Testing: Upon completion of the installation, test each fire door assembly in the project to confirm proper operation of its closing device and that it meets all criteria of a fire door assembly as per NFPA 80 2007 Edition. The inspection of the fire doors is to be performed by individuals with knowledge and understanding of the operational components of the type of door being subjected to testing and who are either credentialed as an Architectural Hardware Consultant (AHC) or as a Fire Door Annual Inspector (FDAI). A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The record shall list each fire door assembly throughout the project, and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation. Clean hardware components as necessary to restore proper finish. Provide protection during the progress of the work and maintain conditions that ensure door hardware is in perfect working order and without damage or deterioration at time of Substantial Completion.

3.5 DOOR HARDWARE SCHEDULE

- A. Refer to Drawings.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Doors.
 2. Shower doors and enclosures.
 3. Glass shelves.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each glass product and glazing material indicated.
- B. Samples: Label samples to indicate product, characteristics, and locations in the Work. Furnish samples of the following:
1. Except for clear glass, submit samples of each glass type specified, in the form of 12 inch (300 mm) square Samples.
 2. Submit samples of each glass type specified where production run varies and defects are expected.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Submit a letter from glass manufacturer certifying that he has reviewed the glazing details proposed for the Project, including the use of gaskets and sealants, and that each product to be furnished is recommended for the application shown.
- B. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
1. Material Certificates: Submit glass treatment certificates signed by manufacturer of the heat-soaked glass products certifying that products furnished comply with requirements.
- C. Warranties: Submit special warranties specified in this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance data for each applied glass film to be installed or applied, including recommendations and instructions for cleaning, maintenance, removal, and replacement of same.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing 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.
- B. Safety Glass: Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal and Municipal authorities having jurisdiction; wherever requirements conflict, the more stringent shall be required. Obtain approvals from all such authorities. As a minimum, provide Category II materials complying with testing requirements in 16 CFR 1201 (Consumer Product Safety Commission "Safety Standard for Architectural Glazing Materials," as published in the Code of Federal Regulations) and ANSI Z97.1.
 - 1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Locate permanent markings in one corner, and in the same location, of each glass lite in accordance with the requirements of the SGCC labeling guidelines. Markings shall have a nominal size of no greater than 1-inch (25.4-mm) in diameter, and be located with glass edge clearances, at the corner, by not more than 3/4-inch (19-mm) up and 3/4-inch (19-mm) over.
- C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials.
- B. Deliver film to Project site, and handle/store in accordance with manufacturer's instructions, in unopened containers and in a manner that will ensure no deterioration of, or detrimental effects on, film and its system for adhering to glass. Protect from weather and physical abuse.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that develop edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those specified within the warranty period indicated below. Upon notification of such deterioration within the warranty period, furnish replacement glass units for those glass units having edge separation, delamination, and blemishes at the convenience of the Owner.

1. Warranty Period: Five years from date of Substantial Completion.
- B. Heat Soaked Tempered Glass Special Warranty: Executed by the Contractor, manufacturer and the glass installer agreeing to replace glass units that spontaneously break as a result of Nickel Sulfide (NiS) inclusions within the specified warranty period without material or labor charges to the Owner.
 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Refer to Finish Schedule on the Drawings for the extent of glass types and locations. Confirm the levels of heat treatment required for each glass type scheduled as contained in Articles "Performance Requirements" and "Quality Assurance."

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide and install glazing systems capable of withstanding impact loads without failure of any kind, including loss or breakage of glass, failure of seal or gaskets, exudation of glazing sealants, and excessive deterioration of glazing materials.
- B. Glass Design: Glass thicknesses and heat treatments indicated are minimum requirements. Glazing details shown are for convenience of detailing only and are to be confirmed by the Contractor relative to cited standards and final framing details.
 1. At interior aluminum door and frame openings, provide glass thickness such that the center of glass deflection at a full lateral pressure of 5 psf (239 Pa) in a direction normal to the plane of the wall shall not exceed 1/2 inch (13 mm). Confirm glass thicknesses and heat treatments, as required to meet the performance requirements.

2.3 PRIMARY FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); Class 1, clear. as indicated in Finish Schedule on the Drawings.

2.4 HEAT-TREATED FLOAT GLASS

- A. General: Heat-treat glass where required to meet safety glazing requirements.
- B. Sizes and Cutting: Prior to heat treatment, cut glass to required sizes as determined by accurate measurement of openings to be glazed, making allowance for required edge clearances. Cut and process edges in accordance with glass manufacturer's recommendations. Do not cut or treat

edges in the field. Make all internal cuts for hardware, access, or glass-mounted trim or accessories before heat treating.

- C. Fully Tempered Glass: Provide glass complying with ASTM C 1048, Kind FT, and meeting the requirements of ANSI Z97.1. Surface compression shall be equal to or greater than 10,000 psi (69 MPa). After tempering, heat-soak 100 percent of all fabricated glass units to European Union Standard EN14179 to reduce the potential for inclusion related glass breakage. Statistical heat soaking shall not be permitted.

2.5 LAMINATED GLASS

- A. Laminated Glass: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified, including those in the Glass Schedule.
- B. Interlayer: Minimum 0.060 inch (1.5-mm) thick polyvinyl butyral (PVB) sheet or ionoplast sheet interlayer material with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - 1. All interlayer furnished for the Project shall have been manufactured by one of the following:
 - a. Eastman Chemical Company.
 - b. Kuraray.
- C. Laminating Process: Prior to laminating, cut glass to required sizes and profiles as determined by accurate measurement of openings to be glazed, making allowance for required edge clearances. Cut and process edges in accordance with glass manufacturer's recommendations. Do not cut or treat edges in the field. Fabricate laminated glass to produce glass free of scuff vinyl markings, handprints, tag residue, and foreign substances such as lint, hair, vinyl shavings in the central glass area and the outer 20 percent area when viewed from a distance of 39 inches (1 meter) and 10 feet (3048 mm), respectively. Handprints, tag residue, scuff vinyl markings and foreign substances must be separated by more than 12 inches (300 mm) if not detectable at less than the viewing distances. Delaminations, blow ins, short interlayers, and air or gas pockets shall not be permitted in the central glass area. In the outer 20 percent area, delamination will not be permitted; blow-ins, air or gas pockets, and short interlayers shall be limited to a maximum dimension of 3/32 inch (2.38-mm) in diameter, 3/32 inch (2.38-mm) in diameter, and 1/16 inch (1.5-mm) long, respectively. Laminate units as follows:
 - 1. Laminate lites with interlayer in autoclave with heat plus pressure.
 - 2. Fire-Protection Rating: As indicated for the assembly in which the glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Polished on both surfaces, transparent.

2.6 GLAZING SEALANTS

- A. Gasket, Blocking, and Spacer Wet Glazing Materials: Silicone, compatible with and adherent to each material it will be in contact with, as recommended by the manufacturer to fulfill performance requirements.
- B. Butt Glazing Sealants: Refer to Section 07 92 00 "Joint Sealants" for butt glazing sealant.

2.7 GLAZING GASKETS

- A. Dense Compression Gaskets: Continuous extruded EPDM with cross-sectional profile, physical properties, and tolerances as recommended by the glass manufacturer, and as required to comply with the performance requirements specified and shown, all in compliance with the applicable provisions of ASTM C 864, Option II.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces and wet glazing materials contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: EPDM complying with ASTM C 864 (Option II), blocks, 85 +/- 5 Shore A durometer hardness, 1/16 inch (1.5 mm) less than the channel width, and length based on the face area the glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations but not less than 4 inches (101.6 mm).

2.9 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
 - 1. Edge and Surface Conditions: Comply with the recommendations of AAMA "Structural Properties of Glass" for "clean-cut" edges, except comply with manufacturer's recommendations when they are at variance therewith.
 - 2. Exposed Glass Edges and Surface Condition: All edges shall be flat with an arrissed edge profile (small bevel of uniform width not exceeding 1/16 inch (1.5 mm) at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of the glass) surface.
- B. Cutting: Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass 2 inches (50.8 mm) larger than

required in both dimensions, so as to facilitate cutting of clean cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat-treated glass.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier and glass framing erector present, for compliance with the following:
 - 1. Compliance with the specified manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing stops, glazing channels, and rabbets which will be in contact with the glazing materials immediately before glazing. Remove 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 primers. Wipe metal surfaces with IPA (isopropyl alcohol).
 - 1. Prime surfaces to receive glazing compounds. When priming, comply with wet glazing manufacturer's recommendations.
- B. Inspect each glass unit immediately before installation. Do not install any units which are improperly sized or have damaged edges, scratches or abrasion, or other evidence of damage. Remove labels from glass immediately after installation.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
 - 1. All glass units shall be installed in accordance with the glass manufacturer's recommendations.
 - a. Butt Glazed Interior Monolithic Glass Units: Mask the surfaces on both sides of the joints to be glazed. Provide wood dowel, with a diameter of at least three times that of the joint width, wrapped in polyethylene tape, and firmly taped to interior face of glass unit to be glazed to act as a backup during glazing operation. Place

glazing sealant and tool face of sealant slightly concave using extreme care not to chip or otherwise abrade corners of glass. Allow sealant to fully cure before removing dowel.

- B. Glazing channel dimensions as indicated on Drawings. Provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to surfaces indicated to receive glazing materials.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless more stringent requirements are recommended by glass manufacturer.
 - 1. For Glass Units Less Than 72 Inches (1830 mm): Locate setting blocks at sill one-quarter of the width in from each end of the glass unless otherwise recommended by the glass manufacturer.
 - 2. For Glass Units 72 Inches (1830 mm) or Greater: Locate setting blocks at sill one-eighth of the width in from each end of the glass, but not less than 6 inches (150 mm), unless otherwise recommended by the glass manufacturer.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Set glass lites with uniform pattern, draw, bow, and similar characteristics, producing the greatest possible degree of uniformity in appearance on the entire wall elevation.
 - 1. Set glass units with void between edge of units and glazing channel.
- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- I. Miter cut gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away.

3.4 PROTECTION AND CLEANING

- A. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way and from any source, including natural causes, accidents, and vandalism.
- B. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass and film as recommended by glass and film manufacturer.

END OF SECTION 08 80 00

SECTION 09 21 16.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Shaft enclosures.
 - 2. Chase enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each gypsum board shaft-wall assembly indicated.
 - 1. Submit UL Assemblies for each condition required.

1.3 INFORMATIONAL SUBMITTALS

- A. Fire-Test-Response Reports:
 - 1. Include data substantiating that elevator entrances and other items that penetrate each gypsum board shaft-wall assembly do not negate fire-resistance rating.
- B. Research/evaluation reports.
- C. Acoustical-test-response reports.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain products for gypsum board shaft-wall assembly from a single manufacturer.

1.5 FIELD CONDITIONS

- A. Comply with requirements for environmental conditions, room temperatures, and ventilation specified in Section 09 29 00 "Gypsum Board."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance:

1. Walls: Provide gypsum board shaft-wall assemblies engineered to withstand the following lateral design load (air pressure) and deflection limit for maximum heights of partitions required, without failing and while maintaining an airtight and smoke-tight seal.
 - a. Lateral Loading: 5 psf (239 Pa).
 - b. Deflection Limit: L/240.
2. Horizontal Duct Enclosures: Provide gypsum board shaft-wall assemblies for horizontal duct enclosures capable of spanning distances indicated within deflection limit of L/360. Design clips and runners to allow unimpeded and recurring vertical movement, as determined by structural analysis, of not less than 1/2 inch (13 mm) and to provide positive attachment to structure.

B. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

C. STC-Rated Assemblies: For gypsum board shaft-wall assemblies indicated to have STC ratings, provide assembly materials and construction complying with requirements of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1. STC-Rated Assemblies: Indicated by design designations from Gypsum Association's GA-600, "Fire Resistance Design Manual."

2.2 MANUFACTURERS

A. Basis-of-Design Product: The design for gypsum board shaft-wall assemblies is based on products named on Drawings by design designation of a qualified testing and inspecting agency. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. American Gypsum Co.
2. CertainTeed Corporation.
3. Georgia-Pacific Building Products.
4. National Gypsum Company.
5. United States Gypsum Company.

2.3 MATERIALS AND COMPONENTS

- A. General: Comply with requirements of fire-resistance-rated assemblies indicated.
 - 1. Provide panels in maximum lengths available to eliminate or minimize end-to-end butt joints.
 - 2. Provide auxiliary materials complying with gypsum board shaft-wall assembly manufacturer's written recommendations.
- B. Steel Sheet Components: Metal complying with ASTM C 645 requirements.
 - 1. Protective Coating: Manufacturer's standard corrosion-resistant zinc coating.
- C. Studs: Manufacturer's standard profile for repetitive members and corner and end members and for fire-resistance-rated assembly indicated.
- D. Track (Runner): Manufacturer's standard J-profile track with long-leg length as standard with manufacturer, but at least 2 inches (51 mm), in depth matching studs.
 - 1. Minimum Base Metal Thickness: As indicated.
- E. Jamb Struts: Manufacturer's standard J-profile strut with long-leg length of 3 inches (76.2 mm), in depth matching studs, and not less than 0.0341 inch (0.87 mm) thick.
- F. Gypsum Liner Panels: Manufacturer's proprietary liner panels in 1 inch (25.4 mm) thickness and with moisture-resistant paper faces.
- G. Gypsum Board: ASTM C 1396/C 1396M, core type as required by fire-resistance-rated assembly indicated.
 - 1. Edges: Tapered.
- H. Water-Resistant, Gypsum Backing Board: ASTM C 630/C 630M, core type as required by fire-resistance-rated assembly indicated.
- I. Cementitious Backer Units: ANSI A118.9, in manufacturer's standard thickness, but at least 1/2 inch (12.7 mm) thick.
- J. Accessories: Cornerbead, edge trim, and control joints of material and shapes specified in Section 09 29 00 "Gypsum Board" that comply with gypsum board shaft-wall assembly manufacturer's written recommendations for application indicated.
- K. Gypsum Board Joint-Treatment Materials: ASTM C 475 and as specified in Section 09 29 00 "Gypsum Board."
- L. 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.
- M. Track (Runner) Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft-wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
1. Powder-Actuated Fasteners: Provide powder-actuated fasteners with capability to sustain, without failure, a load equal to 10 times that imposed by shaft-wall assemblies, as determined by testing conducted by a qualified independent testing agency according to ASTM E 1190.
- N. Acoustical Sealant: As specified in Section 09 29 00 "Gypsum Board."
- O. Sound Attenuation Blankets: ASTM C 665 for Type I, unfaced mineral-fiber-blanket insulation produced by combining thermosetting resins with mineral fibers manufactured from slag or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board shaft-wall assembly attaches or abuts, with Installer present, including access panel frames, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Sprayed Fire-Resistive Materials: Coordinate with gypsum shaft-wall assemblies so both elements of Work remain complete and undamaged.

3.3 INSTALLATION

- A. Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:
1. ASTM C 754 for installing steel framing.
 2. Section 09 29 00 "Gypsum Board" for applying and finishing panels.
- B. Do not bridge building expansion joints with shaft-wall assemblies; frame both sides of joints with furring and other support.

- C. Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.
 - 1. At elevator hoistway door frames, provide jamb struts on each side of door frame.
 - 2. Where handrails directly attach to gypsum board shaft-wall assemblies, provide galvanized steel reinforcing strip with 0.0312 inch (0.79 mm) minimum thickness of base (uncoated) metal, accurately positioned and secured behind at least one face-layer panel.
- D. At penetrations in shaft wall, maintain fire-resistance rating of shaft-wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- E. Isolate gypsum finish panels from building structure to prevent cracking of finish panels while maintaining continuity of fire-rated construction.
- F. Install control joints to maintain fire-resistance rating of assemblies.
- G. Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly. Install acoustical sealant to withstand dislocation by air-pressure differential between shaft and external spaces; maintain an airtight and smoke-tight seal; and comply with manufacturer's written instructions or ASTM C 919, whichever is more stringent.
- H. In elevator shafts where gypsum board shaft-wall assemblies cannot be positioned within 2 inches (51 mm) of the shaft face of structural beams, floor edges, and similar projections into shaft, install 1/2 or 5/8 inch (12.7 or 15.9 mm) thick, gypsum board cants covering tops of projections.
 - 1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft-wall framing.
 - 2. Where steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) on center and extend studs from the projection to the shaft-wall framing.
- I. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION 09 21 16.23

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes non-structural metal framing assemblies.

1.2 PRE-INSTALLATION MEETING

- A. Preconstruction Conference: Prior to start of the non-structural metal framing work, and at the Contractor's direction, meet at Project site and review the installation procedures and coordination with other work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose work must be coordinated with the non-structural metal framing and the gypsum wallboard work.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each product indicated.
- B. Samples: Submit full size samples in 12 inch (300 mm) long lengths for each exposed trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Sound Transmission Characteristics: For non-structural metal framing faced with gypsum wallboard materials and having STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
 - 1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 754 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. Gypsum Board Assembly Deflections:
 - 1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf (239 Pa).
 - 2. Walls with Tile Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf (239 Pa).
 - 3. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.

2.3 STEEL SUSPENDED CEILING FRAMING

- A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625 inch (1.59 mm) diameter wire, or double strand of 0.0475 inch (1.21 mm) diameter wire.

- C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.
- D. Hangers: As follows:
 - 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162 inch (4.12 mm) diameter.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2 inch (12.7 mm) wide flange, with manufacturer's standard corrosion-resistant zinc coating.
- F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating. No equivalent coatings allowed.
 - 1. Cold Rolled Channels: 0.0538 inch (1.37 mm) bare steel thickness, with minimum 1/2 inch (12.7 mm) wide flange, 3/4 inch (19.1 mm) deep.
 - 2. Steel Studs: ASTM C 645, 0.0312 inch (0.79 mm) minimum base metal thickness and minimum depth as required to suit deflection criteria.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
 - a. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
 - 4. Resilient Furring Channels: 1/2 inch (12.7 mm) deep members designed to reduce sound transmission.
- G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 STEEL PARTITION AND SOFFIT FRAMING

- A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
 - 1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
 - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating. No equivalent coatings (EQ) allowed.
- B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details; one of the following:
 - 1. Allsteel & Gypsum Products, Inc.
 - 2. CEMCO.

3. Clark Dietrich.
 4. Consolidated Fabricators, Corporation.
 5. Craco Manufacturing, Inc.
 6. Custom Stud, Inc.
 7. Marino\WARE.
 8. Phillips Manufacturing Company.
 9. Quail Run Building Materials, Inc.
 10. SCAFCO Corporation.
 11. Southeastern Stud & Components, Inc.
 12. Telling Industries.
 13. The Steel Network.
 14. Minimum Base Metal Thickness:
 - a. Typical: As required to comply with deflection criteria but not less than 0.0179 inch (0.45-mm).
 - b. Partitions Supporting Wall Mounted Casework: 0.053 inch (1.3 mm) minimum thickness.
 15. Depth: As indicated.
- C. Double-Runner System: ASTM C 645 top runners, inside runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
- D. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT).
 - b. Metal-Lite, Inc.; Slotted Track.
 - c. The Steel Network, Inc; VertiClip SLD Series or VertiTrack VTD Series.
- E. Firestop Track: ASTM C 645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
 - b. Metal-Lite, Inc.; The System.
 - c. The Steel Network, Inc.; VertiClip SLD Series or VertiTrack VTD Series.

- F. Flat Strap and Backing Plate: 36 inch (914 mm) wide by 6 inch (150 mm) high steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated. Locate to span a minimum of 2 studs.
1. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
- G. Cold-Rolled Channel Bridging: For channel bridging for fixture attachment or lateral bracing provide 0.0538 inch (1.37 mm) bare steel thickness, with minimum 1/2 inch (12.7 mm) wide flange:
1. Depth: 1-1/2 inches (38.1 mm).
 2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068 inch (1.73 mm) thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 2. Depth: 7/8 inch (22.2 mm).
- I. Resilient Furring Channels: 1/2 inch (12.7 mm) deep, steel sheet members designed to reduce sound transmission.
- J. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members securely to substrates involved; complying with the recommendations of the gypsum board manufacturers for applications indicated.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
 2. AC-20 FTR; Pecora.
- C. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell, compressible, non-extruding, sound transmission reducing, vinyl foam tape strips with approximately 13 Shore 00 hardness that allow fastener penetration without foam displacement, 0.75 inch (19 mm) thick, in width 1/2 inch (12.7 mm) less than window mullion width.
1. V7324 Norton Sealant Tape; gray color.

- D. Wood Blocking and Plywood Concealed in Partition Construction: Fire retardant treated, refer to Section 06 10 53 "Miscellaneous Rough Carpentry."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. 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-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) on center.
 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of the non-structural metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. General: Install steel framing to comply with ASTM C 754, ASTM C 840 and the gypsum board manufacturer's recommendations, where standards conflict the more stringent shall apply.
- B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

- a. Use deep-leg deflection track where indicated.
- b. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

A. Suspended Ceiling Framing:

1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.

C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.

E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches (600 mm) on center unless closer

spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.

1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.
 2. Install two beads of sealant below floor tracks for acoustical and dust control.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 3. Terminate partition framing at suspended ceilings where indicated.
 4. Terminate partial height partition framing as indicated.
- D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:
1. Space studs 16 inches (400 mm) on center, unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Install backerplates for support of wall mounted items.
- G. Curved Partitions:
1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 2. Support outside (cut) leg of track by clinching steel sheet strip, 1 inch (25 mm) high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
 3. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches (150 mm) on center.
- H. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs

to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install two studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches (150 mm) from jamb studs at single doors greater than 48 inches (1200 mm) and at all pairs of doors.
 2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches (600 mm) on center.
 3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
 4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- I. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- J. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

3.6 CLEANING AND PROTECTION

- A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure non-structural metal framing work remains without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Interior gypsum board.
 2. Tile backing panels.

1.2 PRE-INSTALLATION MEETING

- A. Prior to start of each type of gypsum board system, and at the Contractor's direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer, as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum board Work.

1.3 ACTION SUBMITTALS

- A. Samples: Submit full size samples in 12 inch (300 mm) long lengths for each exposed trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- B. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- C. Mockups: Before beginning gypsum board installation, 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 the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 3. Simulate finished lighting conditions for review of mockups.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Installation of gypsum board joint treatments shall not start until the space to receive gypsum board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 deg F (8 deg C), from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of gypsum board manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

2.2 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. American Gypsum.
 2. CertainTeed Corp.
 3. Georgia-Pacific Gypsum LLC.
 4. Continental Building Products/Lafarge North America Inc.
 5. National Gypsum Company.
 6. PABCO Gypsum.
 7. USG Corporation.
- B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- C. Gypsum Board: ASTM C 1396/C 1396M.
 1. Type X:
 - a. Thickness: 5/8 inch (15.9 mm).
 - b. Long Edges: Tapered.
 - c. Location: Vertical surfaces, where required for fire-resistance-rated assembly, and where indicated on Drawings.
- D. Flexible Gypsum Board for Curved Surfaces: ASTM C 1396/C 1396M, manufactured to bend to fit tight radii and to be more flexible than standard regular-type panels of the same thickness.
 1. Thickness: 1/4 inch (6.4 mm).
 2. Long Edges: Tapered.
 3. Location: Apply in double layer at curved assemblies.
- E. Gypsum Ceiling Board: ASTM C 1396/C 1396M, manufactured to have more sag-resistance than regular-type gypsum board.
 1. Thickness: 1/2 inch (12.7 mm).
 2. Long Edges: Tapered.
 3. Location: Interior ceiling surfaces.

- F. Moisture and Mold Resistant Board: ASTM C 1396/C 1396M; with moisture- and mold-resistant core and facing surfaces.
1. Core: 5/8 inch (15.9 mm).
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 4. Location: Interior ceiling surfaces.

2.4 TILE BACKING PANELS

- A. Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with core type and in thickness indicated. Available products include:
 - a. G-P Gypsum Corp.; Dens-Shield Tile Backer.
 - b. National Gypsum Company; GOLD BOND Brand E²XP Tile Backer.
 - c. USG; Securock Glass Mat Sheathing.
 - B. Cementitious Backer Units: ANSI A118.9, in thickness indicated.
 1. Thickness: 1/2 inch (12.7 mm).
 - C. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

2.5 TRIM ACCESSORIES

- A. Interior Steel Trim Accessories: ASTM C 1047; formed metal sheet steel zinc coated by hot-dipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
1. Cornerbead: Use at outside corners.
 2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
 3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
 4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
 5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.
- B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch (6.35 mm) diameter holes in fins for attachment to gypsum board or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled gypsum board thickness shown.

2.6 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of the products and joint treatment materials for each application indicated.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
 - 3. Paperless Gypsum Board: 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, flanges of trim accessories, and fasteners, use setting-type taping compound.
 - 3. Second Coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
 - 4. Third Coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Moisture/Mold-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
 - 2. Cementitious Backer Units: As recommended by manufacturer.
- E. Joint Compound for Specialty Boards: As recommended by manufacturer.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
 - 1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
 - 2. AC-20 FTR; Pecora.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. 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 slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 2. Product: Subject to compliance with requirements, provide one of the following:
 - a. Roxul AFB; Roxul Inc.
 - b. Rockwool Acoustic Slabs; Rockwool Ltd.
 - c. SAFB Blankets; Thermafiber LLC.
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Adhesives shall have a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216, and the gypsum board manufacturer's recommendations, where standards conflict, the more stringent shall apply. Install specialty gypsum board as specified below except where manufacturer's instructions conflict; follow manufacturer's instructions for specialty performance board to maintain warranty coverage.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Single-Layer Application:
 1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid

- abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
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 or avoid them entirely.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- D. Multilayer Application:
1. 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.
 2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints one framing member, 16 inches (406 mm) minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, 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.
- H. Curved Partitions:
1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12 inches (300 mm) long straight sections at ends of curves and tangent to them.
 2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
 3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches (300 mm) o.c.
 4. 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.

5. Allow wetted gypsum panels to dry before applying joint treatment.
- I. Tile Backing Panels:
 1. Cementitious Backer Unit Application: ANSI A108.11 at showers, where substrates are indicated to receive Tile Units having a Face Dimension of Greater than 8 by 8 inches (203.2 mm x 203.2 mm), and where otherwise indicated.
 2. Glass-Mat, Water-Resistant Backing Panel: Install with 1/4 inch (6 mm) gap where panels abut other construction or penetrations.
 - J. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
 - K. 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.
 - L. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
 - M. Attach gypsum panels to framing provided at openings and cutouts.
 - N. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Fit gypsum panels around ducts, pipes, and conduits.
 2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4 to 3/8 inch (6.4 to 9.5 mm) wide joints to install sealant.
 3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum board braces no less than 1/2 inch (12.7 mm) thick by 12 inches (300 mm) wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.
 - O. Isolate perimeter of non-load-bearing gypsum board 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 U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - P. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion 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 manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- Q. Cut openings in gypsum board for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.
- R. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
 2. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.
 3. Install fasteners not less than 3/8 inch (9.5 mm) from ends or edges of gypsum board sheets, spacing fasteners opposite each other on adjacent ends or edges.
 4. Begin fastening from center of gypsum board and proceed toward edges and corners.
 5. Apply pressure on surface of gypsum board adjacent to fasteners being driven to ensure that gypsum board will be secured tightly to supporting members.
 - a. Drive fastener with shank perpendicular to face of board.
 - b. Drive screws with a power screwdriver as recommended by gypsum board manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semiexposed. Provide interior trim accessories with face flange formed to receive joint compound.
- D. Install aluminum trim accessories where indicated.
- E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C 840 which is as follows:
1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet (9,100 mm).
 3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet (15,000 mm) and total area between control joints does not exceed 2500 square feet (230 sq m).
 4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet (9,100 mm) and total area between control joints does not exceed 900 square feet (84 sq m).

5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

3.4 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. 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 those with trim having flanges not intended for tape.
- D. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- E. Glass-Mat, Water-Resistant Backing Panels: Do not use paper tape and joint compound. Finish according to manufacturer's written instructions.
- F. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
 3. Level 3: Typically not used.
 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where gypsum board is indicated to receive wall coverings, semi-gloss and high gloss paints, and Italian plaster.

3.5 CLEANING AND PROTECTION

- A. Clean floors of all gypsum board debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes ceramic, porcelain and glass tile.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with one of the following standard and performance requirements.
- B. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Submit shop drawings showing the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples: Submit samples showing full range of color and texture variations expected.
 - 1. Full size units of each type, composition, color, and finish of tile. Submit at least three samples of each tile proposed. Where tile size is smaller than 6- by-6-inches (150-by-150-mm), submit sample boards a minimum of 12-by-12-inches (300-by-300-mm) showing variation of color and finish.
 - 2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile. Minimum size 12-by-12-inches (300-by-300-mm) or 3 full tiles.
 - 3. Metal edge strip in 6-inch (150-mm) lengths, each type.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.

- B. Master Grade Certificates: Submit master grade certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: Submit manufacturer's certifications for each type of grout and bonding material being provided suitable for the intended use and meet or exceed the referenced standards and the requirements of this Specification.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for each type of product specified.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of tile provided for the Project. Supply in manufacture's unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by the Owner.
 - 1. Two percent of amount installed but not less than one box.

1.7 QUALITY ASSURANCE

- A. Installer: Engage an installer, with a minimum of 5 years of successful commercial tile installations similar in material, design, and scope to that indicated.
- B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run, and of consistent quality in appearance and physical properties for each contiguous area.
- C. Field-Constructed Sample Installations: Before installing tile, erect sample installations for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build sample installations to comply with the following requirements, using materials indicated for final unit of Work.
 - 1. Locate sample installations on site, in locations and size indicated or, if not shown or indicated, as directed by Architect but not less than 100 sq. ft. (9.29 sq. m) area for floors, and not less than 100 sq. ft. (9.29 sq. m) area for walls.
 - 2. Retain and maintain sample installations during construction in undisturbed condition as a standard for judging completed unit of Work.
 - 3. Approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- B. Provide minimum 28 day cure of concrete and concrete masonry units before the installation of the tile work.
- C. Ensure cement and plaster rendering has been applied to interior concrete masonry wall surfaces and has been reviewed by the installer for suitability to receive his mortar bedding materials prior to installation of the tile work.
- D. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C), in spaces during tile setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer
- E. Close spaces to traffic during tile flooring installation.
- F. Close spaces to traffic for 72 hours after tile flooring installation.
- G. Shade all tile, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL (TL##)

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 "Specifications for Ceramic Tile," and ANSI A137.2, "Specifications for Glass Tile," for types, compositions, and other characteristics indicated.
 - 1. Products and Manufacturers: Provide tile matching the Architect's samples which have been selected from the product lines and manufacturers indicated in Finish Schedule on Drawings.

- B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- C. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.
- D. Rectified Tile Edges: Provide all tile units having a face dimension of greater than 8" x 8" (200 x 200 mm) with factory rectified edges.

2.2 ACCESSORY MATERIALS

- A. Waterproofing for Toilet Room Tile Installations:
 - 1. Fabric-Reinforced and Unreinforced Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastic AquaDefense, which is manufactured in the plant closest to the geographic location of the project.
 - d. Ardex; Ardex 8+9 which is manufactured in the plant closest to the geographic location of the project.
- B. Crack Isolation Membrane for Tile Installations:
 - 1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) (ASTM D 3960), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane, which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastic AquaDefense, which is manufactured in the plant closest to the geographic location of the project.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations: Provide products manufactured in the plant closest to the geographic location of the project.

- B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials and waterproofing materials containing latex or latex additives from a single manufacturer.
- C. Latex-Portland Cement Mortar (Thin Set):
1. Prepackaged dry-mortar mix combined with dry powder latex additive, one of the following:
 - a. For Thin Set Placed over Slabs on Grade: ANSI A118.4 consisting of the following:
 - 1) Ultraflex 2 Mortar; MAPEI Corporation.
 - 2) Laticrete 253 Gold; Laticrete International Inc.
 - 3) Versabond Flex; Custom Building Products.
 - b. For Thin Set Tile Set over Walls, Membranes and Over Elevated Slabs: ANSI A118.15 consisting of the following:
 - 1) Kerabond Keralastic; MAPEI Corporation.
 - 2) Laticrete 272 mixed with Laticrete 333 Superflex; Laticrete International Inc.
 2. For wall applications, provide nonsagging mortar.
 3. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturers written recommendations for mortar selection and application.
- D. Dry Set Mortar for Large and Heavy Tile (LHT Mortar): ANSI A118.4:
1. Prepackaged dry-mortar mix combined with additives to minimize slump and facilitate a thicker bond coat, and specifically manufactured and recommended in writing by the mortar and underlayment manufacturer for use in LHT mortar assemblies; one of the following:
 - a. Ultraflex LFT Mortar; MAPEI Corporation.
 - b. Laticrete 4-XLT; Laticrete International Inc.
 2. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturers written recommendations for mortar selection and application.
- E. Polymer-Modified Tile Grout (For Typical Applications): ANSI A118.7 compounded with calcium aluminate cement, non-shrinking, efflorescence free grout.
1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients, one of the following:

- a. Prism; Custom Building Products.
 - b. Permacolor; Laticrete International Inc.
 - c. Ultracolor Plus FA; Mapei Corporation.
2. Colors: As selected by Architect from manufacturers standards to match tile being grouted.

2.4 MISCELLANEOUS MATERIALS

- A. Joint Sealants:
1. Typical Surfaces: 'Mildew-Resistant Silicone Sealant', as specified in Section 07 92 00 "Joint Sealants."
 2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications,' as specified in Section 07 92 00 "Joint Sealants."
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Grout manufacturers recommended product for sealing cementitious grout joints and that does not change color or appearance of grout.
- D. Underlayment Product for Leveling and Patching Floors indicated to receive Tiles : Latex-modified, cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Either Ultraplan or Novaplan Underlayment; MAPEI Corporation.
 2. NXT Level Plus Underlayment; Laticrete International Inc.
- E. Metal Edge Strips for Wall Applications: Metallic, angle or L-shaped, depth to match tile and setting-bed thickness and having an integral provision for anchorage to substrate; white zinc alloy exposed-edge material; furnish in longest lengths available.
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. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- F. Divider, Transition, and Movement Joint Strips:
1. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A 666 (for flat bar) and ASTM A 276 (for shapes) Type 304 stainless steel, 1/4 inch (6.35 mm) wide at top edge unless otherwise indicated, depth as required to suit conditions shown and having an integral provision for anchorage to mortar bed or

substrate, unless otherwise indicated. Provide NAAMM #4 satin finish at exposed top edge in the long direction, furnish in longest lengths available.

2. Movement Joint Strips: Laminations of extruded aluminum or formed stainless steel angle shapes, depth as required to finish flush with top surface of adjacent tile flooring fields, back to back installed with full height flexible filler to accommodate movement. Control joints shall have either an exposed approximately 5/8 inch (16 mm) wide interlocking continuous top to conceal prefabricated flexible filler or an exposed custom flexible prefabricated filler to accommodate movement. Joint assembly shall have a total movement capability of approximately 1/4 +1/8 inch/-3/32 /inch (5 mm +3 mm/-2 mm). Finish of exposed top to be satin. One of the following:
 - a. Basis of Design: Emseal Series ESF 16 AL; Emseal Joint Systems, Ltd.
 - b. Schluter; Dilex - EDP, fabricated to comply with the specified requirements.
 - c. CTC (Ceramic Tool Company); CTC Joint custom fabricated to comply with the specified requirements.
 - d. Vexcolt; Ti-Lock Metal, TAM NL 42151 (for thickset) or TAM NA 1212 (for medium and thinset).

2.5 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions. Add materials and liquid latex additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

- A. Prior to the installation of tile, and at the Contractor's direction, meet at the Project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.
 1. Verify that substrates for setting tile are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions, and which are dry, clean, free of oil, waxy films, and curing compounds. Grind or scarify concrete substrates to remove existing floor

adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.

2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 3. Verify that joints and cracks in the existing floor substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
 4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate using a method and an underlayment product(s) that is compatible with and acceptable to the setting materials manufacturer.
 - a. Subfloor Surfaces to Receive Thinset and LHT Mortar Setting Beds: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.
 - b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet (6.35 mm in 3.05 m) non-cumulative.
 - c. No valleys or ridges greater than 1/8 inch (3 mm).
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.
- B. Blending: Color blend tiles at Project site before installing.
 1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

- A. Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" and the TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" that apply to types of setting and grouting materials and to methods indicated.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
 1. Glass Tile Cutting: Use a blade suitable for cutting glass which must be constantly kept wet with water. Cut tiles with the colored surface turned upwards. Cutting shall not be

carried out near the edges of the individual tiles. Smooth off any sharp edges with sandpaper. Holes can be made with a drill bit specifically recommended for drilling glass with a diameter up to 5/16-inch (8-mm). Apply water continually while drilling.

- D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. 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.
- E. Finished Surfaces: Unless otherwise accepted in the sample installation(s), if any, finished surfaces shall present a flat, even appearance, free from waver, projections, and depressions.
- F. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials, but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where movement joints are to be butted, the ends shall touch and align.
1. Spacing Guidelines:
 - a. 20 to 25 feet (6,096 to 7,620-mm) in each direction where interior tile work is not exposed to direct sunlight or moisture.
 - b. 8 to 12 feet (2,438 to 3,658-mm) in each direction where interior tile work is exposed to direct sunlight and moisture.
 - c. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
 - d. In the joint between tiles making up the inside corner of planes.
 - e. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the tile surfaces, but not through membranes.
 - f. Vertical and Horizontal Joints Widths: Widths for quarry tile and paver tile shall be the same as the grout joint but not less than 1/4 inch (6-mm) or the width of the contraction, control, expansion, seismic, isolation joint whichever is greater; widths for ceramic mosaic tile and glazed wall tile shall not be less than 1/8 inch (3-mm) or the width of the control, expansion, seismic, joint whichever is greater.
 - g. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."
- G. Metal Edge Strips: Install where exposed edge of wall tile meets other wall finishes that finish flush with or below face of tile and the manufacturer of the field tile does not manufacture a tile edge transition trim. Where metal edge strips are indicated and full length single units are not available, joints are to be butted, ends shall touch and align.

- H. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
 - 1. Do not install tile over waterproofing until waterproofing has cured, and at each horizontal installation, has been tested for water tightness. Test waterproofing membrane for watertightness by damming the floor drain, and creating a dam at the perimeter of the waterproofed basin followed by filling the basin with water, marking the height, and verifying the same height after 48 hours. Repair leaks before continuing with the installation of subsequent tile.

3.6 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 and bonded securely to substrate.
 - 1. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 FLOOR TILE INSTALLATION

- A. Thinset Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
 - 1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 - 2. Concrete Subfloors, Interior: TCNA F113.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch (1.5-mm).

- d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. Rake out joints to depth required to receive grout as tile units are set.
 - e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- B. Thinset Tile over Waterproof Membrane (Toilet Rooms and Showers): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F122 (on ground) and F122A (above ground).
 - a. Apply the mortar to waterproofed slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch (1.5-mm).
 - e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color,

smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

- C. Thinset Tile over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F125-Full.
 - a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch (1.5-mm).
 - e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- D. LHT Set Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F205 (on-ground slabs) and TCNA F205A (above ground slabs) except apply LHT bed in thickness of 3/4" unless otherwise indicated.

- a. Where required by the conditions indicated, apply underlayment using methods and within time limits recommended by the mortar manufacturer.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, place and comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
 - e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.8 WALL TILE INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.
 2. Glass-mat, water-resistant, Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W245, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.
 3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCNA W244C, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.
 4. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.9 RECESSED ACCESS DOOR PANEL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5, applied to access panel manufacturer supplied metal lath welded to panel substrate.
 2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.
 3. Grout Installation: Do not begin grouting tile units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the tile unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.10 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all 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. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work. Replace all cracked, chipped, and broken tile units with matching tile units; patched tile units will not be permitted.
- C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

END OF SECTION 09 30 00

SECTION 09 30 33 - STONE TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes stone tile.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with one of the following standards and performance requirements.
- B. Static Coefficient of Friction (SCOF): For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Step Treads: Minimum 0.6.
 - 3. Ramp Surfaces: Minimum 0.8.
- C. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 PRE-INSTALLATION COORDINATION

- A. Pre-Installation Meeting: Prior to the start of interior stonework, a meeting shall be held at the project site to review installation procedures and coordination with other work. The meeting shall include the interior stone subcontractor, Contractor, Architect, Owner, membrane installer(if any), scarification subcontractor (if any), and representatives of other trades affected by the Work.
- B. Coordinate all aspects of the stonework with contiguous work and provide components at the proper time and sequence to avoid delays in the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of stone, setting and grouting material.
 - 1. Include submittal of stone sealer manufacturer's recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone flooring materials.

- B. Shop Drawings: Submit shop drawings indicating plans, elevations, and details showing stone tile sizes, dimensions of tiled areas, joint patterns, and tile patterns.
1. Show the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in substrates receiving stone and finished stone surfaces.
- C. Samples:
1. Submit sets of 12-inch (300-mm) square samples for each color, grade, finish, type and specie of stone consisting of units not less than full face size indicated for each stone thickness. Include 3 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work. Stone delivered to the jobsite, or installed, and which does not fall within the accepted sample range, may be subject to removal and replacement with stone that falls within the accepted sample range at no cost to the Owner.
 - a. Include sealer treatment on one half of exposed stone face for each sample submitted.
 2. Submit one 12 inch (300 mm) long sample of each stone divider and transition strip.
 3. Submit 12 inch (300 mm) long grout Samples for each color grout to be used to grout each type, composition, color, and finish of stone.
 4. Submit a minimum of two samples of stone with setting material and sealant applied to demonstrate that materials do not stain stone tiles.

1.5 INFORMATIONAL SUBMITTALS

- A. Floor Stone Testing Results: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of stone flooring with requirements specified for slip resistance.
- B. Product Certificates: Submit manufacturer's certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this specification.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance instructions for each type of product specified.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility for Stone: Obtain each stone from a single source with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to cut and finish material without delaying the progress of the Work.

B. Installer Qualifications:

1. Subcontract the stone tile work to a single firm with a minimum of 10 years successful experience in conventional set stonework comparable to that shown and specified, in not less than three projects of similar scope to the satisfaction of the Architect. The stonework includes, but is not necessarily limited to, the following:
 - a. All preparation for stone tile work, including but not limited to, submittals, site erection, and sample installations as specified herein.
 - b. Interior direct cladding to partitions, interior stone flooring and stone thresholds.
 - c. All anchors, supports, inserts and fasteners for the above, fabrication and installation of same.
 - d. All sealants and joint fillers in conjunction with the above.

C. Floor Stone Testing: Test project specific stone flooring materials (each specie and finish) to verify the dilution rates, visual and physical performance of the impregnator and stone protection coats. Test for slip resistance in accordance with ASTM C 1028 and report the static coefficient of friction for each stone specie and finish.

D. Drylay Sample Installation:

1. Following review of stone samples and shop drawings, and after fabrication of stone but prior to stone delivery to site, construct drylay sample installations for all interior stone flooring. Each drylay sample installation shall be complete with all stone proposed to be used for the project arranged as shown on the final accepted shop drawings.
 - a. The purpose of the drylay installation is to avoid the potential for on-site rejection of the installed stonework where the reason for rejection would be solely for unsatisfactory stone blending (unsatisfactory color, texture or veining selection or orientation).
2. Drylay sample installations shall be reviewed by the Architect for acceptance of the fabricators stone blending. The Architect shall be permitted to alter the blending of the fabricated material, of like size stone units, to the Architect's satisfaction. The fabrication of new stone units will not be required.
3. Following Architect's review of drylay sample installations submit setting drawings with each stone unit numbered on the drawing to correspond to the identification number on the back of each stone unit in the accepted drylay installation.

E. Field-Constructed Sample Installations: After review of samples, acceptance of shop drawings, and after drylay installation, prepare sample installations for the following types of stonework. Purpose of sample installations is in establishing standard of quality for stone jointing and workmanship expected in completed Work. Build sample installations to comply with following requirements:

1. Locate sample installations on site where indicated or, if not indicated, as directed by Architect.
2. Build sample installations of the following Work:

- a. Typical modules, minimum 10'-0" x 10'-0" (3048 x 3048 mm) of interior paving (each type) including divider and transition strips.
 - b. Typical interior stone wall cladding, approximately 72 inches (1800 mm) long by 96 inches (2400 mm) high.
 - c. Typical interior stone wainscot cladding, approximately 72 inches (1800 mm) long by height indicated.
 - d. Stone base, approximately 72 inches (1800 mm) long.
3. Retain sample installations during construction as a standard for judging completed stonework. Do not alter, move or destroy sample installations until Work is completed. Accepted sample installations may become part of the completed Work if undisturbed at time of Substantial Completion. Rejected sample installations shall be completely demolished, removed and replaced until accepted.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project in undamaged condition.
- B. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.
 1. Do not use pinch or wrecking bars.
 2. Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.
 3. Store stones on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.
 4. Protect stone on wood skids or pallets, covered with non-staining, waterproof membrane, but allow air to circulate around stones.
 5. Store cementitious materials off the ground, under cover and in dry location.

1.9 FIELD CONDITIONS

- A. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C), in spaces during stone setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer.
- B. Close spaces to traffic during stone flooring installation.
- C. Close spaces to traffic for 72 hours after stone flooring installation.
- D. Shade all stone, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 STONE, GENERAL

- A. Comply with referenced standards and other requirements indicated applicable to each type of material required.
- B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.
- C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:
 - 1. Color Range: Matching Architect's samples; uniform with no discernable variations between pieces in any contiguous area.
 - 2. Finishing Technique:
 - a. Polished Finish: Uniform highly reflective mirror gloss finish with the full color and crystal structure of the stone visible through the finish. Evidence of swirl shall not be permitted.
 - b. Honed Finish: Uniform throughout. Evidence of swirl shall not be permitted.

2.2 STONE TYPES (ST##)

- A. General: Comply with ASTM C 503 for marble, and as follows. Stone shall be sound, durable, and free of imperfections such as spalls, cracks, starts, seams, pits, stain producing minerals, and other defects that will impair its strength, durability and appearance. All material shall be subject to culling as required to match Architect's preselected control samples prior to acquisition and thereafter through all stages of fabrication prior to delivery. Blend tile units at factory/warehouse.
- B. Association Standard for Quality and Fabrication:
 - 1. "Design Manual VII" of Marble Institute of America (MIA).
- C. Species, Finishes, and Suppliers: Provide stone matching the Architect's samples which have been selected from the product lines, suppliers, and quarriers, indicated in the Finish Schedules on the Drawings.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations:
 - 1. Custom Building Products.

2. LATICRETE International Inc.
 3. MAPEI Corporation.
- B. Source Limitations: For each type of stone installation, obtain compatible formulations of setting, grouting and waterproof membrane materials containing latex or latex additives from a single manufacturer and designed to work together as a system
- C. Latex-Portland Cement Mortar (Thin-Set) Mortar: ANSI A118.4 consisting of the following:
1. Prepackaged dry-mortar mix combined with liquid-latex additive.
 2. For wall applications, provide nonsagging mortar.
 3. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.
- D. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:
1. Prepackaged dry-mortar mix combined with liquid-latex additive.
 2. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.
- E. Polymer-Modified Tile Grout: ANSI A118.7.
1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients and which contain dyes that have a proven track record of not leaching into natural stone. Use sanded grout at joints 1/8 inch (3 mm) wide or greater, use unsanded grout at joints 1/8 inch (3 mm) wide or less and wherever polished stone surfaces are to be grouted.
 2. Colors: As selected by Architect from manufacturer's standards to match stone being grouted.
- F. Crack Isolation Membrane for Stone Installations:
1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.
 - c. MAPEI Corporation; Mapelastic AquaDefense.

2.4 ACCESSORIES

- A. General: Use only adhesives formulated for stone and recommended by their manufacturer for the application indicated.

- B. Water-Cleanable Epoxy Adhesive for Adhering Fiberglass Mesh Backed Stone: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Manufacturers:
 - a. Custom Building Products.
 - b. LATICRETE International, Inc.
 - c. MAPEI Corporation.
- C. Organic Adhesive For Adhering Stone Base to Gypsum Board Partitions: ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and non-staining to stone.
- D. Joint Sealants:
1. Typical Surfaces: 'Mildew-Resistant Silicone sealant', as specified in Section 07 92 00 "Joint Sealants."
 2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications', as specified in Section 07 92 00 "Joint Sealants."
- E. Floor Cleaner: Provide stone cleaners of proper formulation for stone types, finishes, and applications indicated, as recommended by stone supplier and, if a sealer is specified, by sealer manufacturer. Use cleaning agents which do not contain caustic or harsh fillers that will damage stone or stone finishes.
- F. Floor Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, Hallandale, FL. (800) 424-2HMK or (415) 643-5603.
1. Impregnator: Slip resistant, low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, and alkali infiltration.
 - a. S32 Silicone Impregnator.
 2. Surface Protection Coating: Slip and scuff resistant, no-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.
 - a. P24 Liquid Stone Soap "No Rinse."
- G. Setting Buttons: Resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stonework involved.
- H. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A 666 (for flat bar) and ASTM A 276 (for shapes) Type 304 stainless steel, 1/4 inch (6.35 mm) wide at top edge unless otherwise indicated, depth as required to suit conditions

shown and having an integral provision for anchorage to mortar bed or substrate, unless otherwise indicated. Provide NAAMM #4 satin finish at exposed top edge in the long direction, furnish in longest lengths available.

2.5 STONE TILE FABRICATION

- A. General: Fabricate stone tile in sizes and shapes required to comply with requirements indicated, including details on Drawings and shop drawings.
- B. Accurately cut, dress, drill, fit and finish stonework to shapes, profiles and dimensions shown on Drawings and/or final shop and setting drawings. Make exposed surfaces straight, sharp, true and continuous at joints within the tolerances specified.
 - 1. Stone Sizes: As indicated.
 - 2. Stone Thickness: 3/8 inch (9.52 mm), unless otherwise shown.
 - 3. Fabrication Tolerances:
 - a. Size and Squareness:
 - 1) Unit Thickness of 3/8 inch (9.52 mm): +/- 1/64 inch (0.4 mm) in 12 inches (304.4 mm) for tiles with polished or honed faces; or plus or minus 1/32 inch (0.8 mm) for tiles with sand-rubbed, natural-cleft, or thermal-finished faces
 - b. Thickness:
 - 1) 3/8 inch (9.52 mm) Stone Tiles with Smooth Finish: Vary from specified thickness by not more than plus or minus 1/32 inch (0.8 mm).
 - 2) 3/8 inch (9.52 mm) Stone Tiles with Natural-Cleft or Thermal Finish: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.6 mm), minus 0 inches.
 - 4. Cut all joints and edges square and at right angles to face, and with backs parallel to face. Make arrises straight, sharp, true, and continuous at joints.
 - 5. Clean sawn stones to remove rust stains and free iron particles.
- C. Finish exposed faces of stones to comply with requirements indicated for finish under each type and application of stone required and to match approved samples and field constructed sample installations.
- D. Fabricate stone thresholds in sizes and profiles as indicated or required to provide transition between adjacent floor finishes.
- E. Carefully inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material and fabrication; replace defective stones with stones that do comply.

2.6 MORTAR AND GROUT MIXES

- A. Mix mortars and grouts to comply with the requirements of referenced standards and with manufacturers' written instructions including those for accurate proportioning of materials and liquid latex additive content; mix materials with type of equipment, selection of speeds, in proper containers, for time periods, and other procedure needed to produce mortars and grouts of uniform quality and with optimum performance characteristics for application specified or indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

- A. Prior to the installation of stone tile, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, stone tile installer, stone and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates and areas where the stonework will be installed, with Installer present.
 - 1. Verify that substrates for setting stone floor tile are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions; and which are dry; clean; free of oil, waxy films, and curing compounds. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind stone tile has been completed before installing stone tile.
 - 3. Verify that joints and cracks in the existing floor substrates are coordinated with the stone joint locations; if not coordinated, adjust joint locations in consultation with Architect.
 - 4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate using a method and a product(s) that is compatible with and acceptable to the setting materials manufacturer.
 - a. Subfloor Surfaces to Receive Thinset and Medium Set Setting Beds: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative or as required by the stone tile manufacturer
 - b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet (6.35 mm in 3.05 m) non-cumulative.
 - c. No valleys or ridges greater than 1/8 inch (3 mm).

- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Grind concrete substrates to remove existing floor adhesive and mortar residues (if any), films, sealing and curing compounds if they are determined to be present on the substrate.
- B. Blending: Color blend tiles at Project site before installing.
 - 1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e., corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

- A. Installation Methods and Standards: Stone setting shall be in accordance with the applicable requirements and recommendations of the Marble Institute of America (MIA), unless otherwise specified or shown.
- B. Stonework shall be installed by skilled mechanics. Employ skilled stone fitters at the site to do necessary field cutting as stones are set.
 - 1. Use power saws with diamond tipped blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.
- C. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Set stone accurately in locations indicated, with uniform joints of 1/8 inch (3 mm), unless greater widths are indicated, and with edges and faces aligned. Do not install stone units which are warped, curled, cracked, chipped, or broken, discolored or not properly finished.
- D. Extend stonework into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- E. Accurately form intersections and returns. Perform cutting and drilling of stone without marring visible surfaces. Fit stone closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap stone. Where cut edges will be visible after installation, finish to match factory-fabricated edges.
- F. Lay stone in grid pattern, unless otherwise indicated. Align joints when adjoining stone units on floor, base, walls, and trim are the same size. Lay out stonework and center stone fields in both directions in each space beginning at thresholds. Lay out stonework and center stone fields in both directions on each wall area. Adjust to minimize cutting.
- G. Divider and Transition Strips: Install divider and transition strips at locations indicated and where exposed edge of stone flooring meets carpet or other flooring which finishes flush with top of stone flooring units.

H. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and stone. Do not saw-cut joints after installing stone.

1. Spacing Guidelines:

- a. Where stone plane abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
- b. In the joint between stone units making up the inside corner of planes.
- c. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the stone surfaces, but not through membranes.
- d. Vertical and Horizontal Joints Widths: Widths for the stone shall be the same as the grout joint but not less than 1/8 inch (3-mm) or the width of the control, expansion, seismic, joint whichever is greater.
- e. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.5 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 and bonded securely to substrate.

1. Do not install stone or setting materials over crack isolation membrane until membrane has cured.

3.6 STONE FLOOR TILE INSTALLATION

A. Thinset Stone Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCNA F113 Stone.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.

- c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16 inch (1.5 mm).
 - d. Place stone tiles onto mortar bed, maintaining 1/8 inch (3 mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile units using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
 - e. Prohibit foot and wheel traffic on stone tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation, Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- B. Thinset Stone over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F125-Full Stone.
 - a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
 - d. Immediately after wiping tile backs, but prior to placing stone tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
 - e. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard

finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

- C. Mediumset Stone Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Thickness of mortar bed: between 1/4 and 3/4 inch.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F113 Stone except apply medium set bed thickness.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
 - c. Immediately after wiping stone tile backs, but prior to placing tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16 inch (1.5 mm).
 - d. Place stone tiles onto mortar bed, maintaining 1/8 inch (3 mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
 - e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- D. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCNA Method TR611.

3.7 STONE TILE WALL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of stone using damp sponges. Rake out joints to depth required to receive grout as stone units are set.

1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.
2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243 Stone, place tiles maintaining 1/8 inch (3 mm) wide joints, and true accurate pattern as shown.
3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.8 INSTALLATION TOLERANCES

- A. Tolerances: Set stone to comply with the following tolerances:
1. Variation from Plumb: +/- 1/8 inch in 10 feet (3 mm in 3048 mm), non-cumulative.
 2. Variation in Level: +/- 1/8 inch in 10 feet (3 mm in 3048 mm), non-cumulative.
 3. Variation in Plane between Adjacent Units (Lipping): +/- 1/32 inch (0.8 mm) difference between planes of adjacent units.
 4. Variation in Joint Width: +/- 1/32 inch (0.8 mm).

3.9 CLEANING, SEALING AND PROTECTION

- A. Cleaning:
1. General: Upon completion of placement and grouting remove latex-portland cement grout residue and haze from stone as soon as possible.
 2. Flooring:
 - a. Curing: Before applying stone impregnator and stone soap allow the setting bed and grout materials to cure a minimum of 21 days.
 - b. Floor Preparation: Clean substrates of substances that could impair penetration and bond of the stone impregnator to stone using cleaning solutions, dilution rates, dwell times as recommended by the stone impregnator manufacturer. Apply cleaning solutions using low speed (175 rpm) floor cleaning machine suitable for deep cleaning, and non-damaging to, smooth textured, stone surfaces coupled with a wet vac; by using a mop and bucket; or using auto-scrub brushing techniques each in accordance with the stone impregnator manufacturer's recommendations. If auto-scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test floor cleaning machine, or auto-scrub brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During machine cleaning, or auto-scrubbing, operations monitor the quality and cleanliness of the equipment, or brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring.

B. Sealing:

1. Impregnator Application: Allow floor to thoroughly dry for 24 to 72 hours after floor preparation. Using brush, or roller, applicators apply two thin, even, wet on wet coats of impregnator allowing 5 to 10 minutes between each coat for proper penetration unless otherwise recommended by the impregnator manufacturer. 10 to 15 minutes after final coat is placed, but prior to its surface drying, remove all excess "puddled" impregnator using a white cloth to avoid splotchy/dull areas. Allow 72 hours for impregnator to cure.
2. Surface Protection Coating: Not more than 4 days before occupancy by Owner apply no-rinse stone surface protection coating to stone using dilution rates as recommended by the surface protection coating manufacturer. Apply surface protection coating by using either mop and bucket or auto-scrub brushing techniques in accordance with the surface protection coating manufacturer's recommendations. If scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During auto-scrubbing operations monitor the quality and cleanliness of the brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring. Do not rinse with water as rinsing will remove the stone surface protection coating.

C. Leave finished installation clean and free of warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone units.

1. Replace warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone in manner which results in stonework matching approved samples and field-constructed sample installations, showing no evidence of replacement.

D. Protect installed stone work with minimum 40 lb kraft paper or other heavy, breathable, covering and maintain conditions in a manner acceptable to the stone material manufacturers and installer that ensures that stone work is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 30 33

SECTION 09 60 13 - ACOUSTIC UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes noise-reducing, impact isolating, underlayment systems for tile and stone flooring.
- B. Related Requirements:
 - 1. Division 03 Sections for Concrete Substrate.
 - 2. Section 09 30 00 "Tiling" for tile flooring receiving acoustic underlayment.
 - 3. Section 09 30 33 "Stone Tiling" for stone tile flooring receiving acoustic underlayment.

1.2 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide recycled rubber resilient underlayment padding, which has been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.3 REFERENCES

- A. Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
 - 2. ASTM C 627 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
 - 3. ASTM E 989 Standard Classification for Determination of Impact Insulation Class (IIC)
 - 4. ASTM E 1007 Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures
 - 5. ASTM E 2179 Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors
 - 6. ASTM E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

7. ASTM E 336 Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.
8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in-situ Probes
9. ASTM D 5116 CHPS/CA 01350 – Collaborative of High Performance Schools, Low-Emitting Materials Criteria
10. ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
11. ASTM F 924 Standard Test Method for Resistance to Puncture of Cushioned Resilient Floor Coverings
12. ASTM F 1265 Standard Test Method for Resistance to Impact for Resilient Floor Tiles
13. ASTM F 2753 Standard Practice to Evaluate the Effects of Dynamic Rolling Load over Resilient Floor Covering System
14. ASTM D 5215 Standard Test Method for Instrumental Evaluation of Staining of Vinyl Flooring by Adhesives
15. ASTM D 297 Standard Test Method for Rubber Products - Chemical Analysis
16. ASTM C 627 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson Wheel-Type Floor Tester
17. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes
18. South Coast Air Quality Management District (SCAQMD) Rule #1168.
 - a. VOC standards for adhesive and sealant applications.

1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Shop Drawings: Submit shop drawings showing the following:
 1. Show locations of seams, details of special patterns, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- C. Samples: Submit samples in manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each type of acoustic underlayment required.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The manufacturer shall be a firm with a minimum of 5 years of successful experience in manufacture of products with similar requirements.
- B. Installer Qualifications: The installer shall be a firm with a minimum of 5 years of successful experience in installation of products with similar requirements.
- C. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer-approved installation methods. Comply with workmanship standard. Comply with Division 1 Quality Control (Mock-Up Requirements) Section.

1. Mock-Up Size: As determined by Architect.
 2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 3. Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.
- D. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's instructions, and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
- E. Pre-installation Testing: Conduct pre-installation testing as follows: specify substrate testing; consult with flooring manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, and undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials at temperature and humidity conditions recommended by manufacturer and protect from exposure to harmful weather conditions.

1.7 FIELD CONDITIONS

- A. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
1. Manufacturer's limited lifetime warranty on the Sound Control Underlayment products against defects in material and workmanship and that the underlayment shall meet all published specifications and shall perform effectively. Manufacturer warrants that during the warranty period the underlayment shall not harden, become brittle, chip, crack, tear, or exhibit any signs of excessive deterioration except for normal wear and tear. All other warranties including implied warranties for a particular purpose are expressly excluded. The sole remedy against the seller will be the replacement or repair of the defective goods, or at seller's option, credit may be issued not exceeding the selling price of the defective goods.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sound Control Underlayment material shall have an Impact Insulation Class (IIC) Laboratory result as tested per ASTM E492 and/or ASTM E2179 with the following floor-ceiling configurations:
1. 5 mm thickness shall be tested over 6" concrete slab with vinyl plank floor covering, no ceiling, IIC 50, Δ IIC21
 2. 5 mm thickness shall be tested over 6" concrete slab with 3/8" laminate wood floor covering, no ceiling, IIC 51 and Δ IIC 21
 3. 5 mm thickness shall be tested over 6" concrete slab with 12"x12" ceramic tile, no ceiling IIC50 and Δ IIC21
 4. The floor-ceiling assembly must be tested in a certified laboratory and comply with ASTM or ISO standards.

2.2 MANUFACTURER

- A. Basis of Design: Pliteq, Inc.; "GenieMat."

2.3 MATERIALS

- A. Underlayment Sheet:
1. Physical Characteristics:
 - a. Composition: Made from recycled SBR (Styrene-Butadiene Rubber) tire rubber.
 - b. Thickness: 10 mm.
 - c. Density: 63.50 lbs/cubic foot (1017.2 kg/m³) per ASTM D1622.
 - d. 48 inches by 15 ft rolls.
 - e. Material Weight: 2.08 lb/ft²
- B. Perimeter isolation strip as recommended by the manufacturer.
- C. Adhesives
1. As recommended by the manufacturer for the specified assemblies.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.4 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Provide manufacturer's field service consisting of product use recommendations in accordance with manufacturer's instructions.
- B. Field Tests should be performed by an independent acoustical laboratory accredited by the U.S. Department of Commerce, National Institute of Standards and Technology under the National Voluntary Laboratory Accreditation Program for the specified test procedure.
- C. The cost for all field acoustical testing, corrective work associated with the installation of the re-bonded recycled rubber Impact Sound Underlayment and flooring to meet the minimum requirements, shall be borne by the flooring contractor(s).

3.5 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.6 PROTECTION

- A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION 09 60 13

SECTION 09 68 16 - SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes installation of broadloom carpet.
- B. Owner-furnished, Contractor-installed items: Carpet and carpet cushion.
- C. Related Requirements:
 - 1. Section 03 30 00 "Cast-In-Place Concrete" for new concrete slabs to receive sheet carpeting.
 - 2. Section 03 54 16 "Hydraulic Cement Underlayment" for patching and leveling of substrates

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-Installation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.
- B. Shop Drawings: Submit shop drawings showing the following:
 - 1. Existing floor materials to be removed.
 - 2. Existing floor materials to remain.
 - 3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
 - 4. Dye lots, pattern types, repeats, locations, pile direction, and starting points per floor.
 - 5. Seam locations, types, and methods.
 - 6. Type of subfloor.
 - 7. Type of installation.

8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Show details of cutouts.
11. Include on shop drawings dimensions which verify field conditions.
12. Transition, and other accessory strips.
13. Transition details to other flooring materials.
14. Type of cushion.

1.4 INFORMATIONAL SUBMITTALS

- A. Field Test Reports: Provide signed field test reports for tests indicated below. Indicate results and test locations. Include manufacturer's recommendations.
 1. Anhydrous calcium chloride test results.
 2. Relative humidity probe test results.
 3. Alkalinity test results.
- B. Warranties: Submit special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a carpet installer, who has completed a minimum of three projects over the last 10 years which were similar in material, design and extent to that indicated for the Project – as determined by the Architect – and which have resulted in construction with a record of successful in service performance.
 1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers specified.
- B. Sample Installations: Before installing carpet, install sample installations for each type of carpet required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following, using materials indicated for the completed Work:
 1. Size and Location: Provide 250 square foot (23.23 sq. m) sample installations in locations as directed by Architect. Subdivide the sample installation with one continuous seam of the type specified.
 2. Demonstrate the proposed range of aesthetic effects and workmanship.
 3. Obtain Architect's approval of sample installations before starting work.
 4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
 5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.
- B. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.
- C. Deliver other materials in manufacturer's unopened containers identified with name, brand, type, grade, class, and other qualifying information.
- D. Store materials in a dry location, in such a manner as to prevent damage.

1.7 FIELD CONDITIONS

- A. General: Comply with CRI 104, Section 7.0 "Site Conditions."
- B. Environmental Limitations: Do not deliver or install carpet or carpet cushion until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and concrete slabs have pH range recommended by carpet manufacturer.

1.8 WARRANTY

- A. Installation Warranty: Submit copies of written warranty signed by the carpet installer and Contractor, warranting the carpet installation, for a period of two years, that the carpeting will not tear, crack, separate, deteriorate or pull loose from substrate, or experience seam failure, ripples, scallops, pilling or puckering.

PART 2 - PRODUCTS

2.1 CARPET (CP##)

- A. Owner-furnished Carpet Types: Provide manufacturer's commercial grade broadloom carpet for 100% glue-down installation as indicated in Finish Schedule on Drawings.

2.2 CARPET CUSHION

- A. Owner-furnished product as recommended in writing by the carpet manufacturer for the application indicated and which will not void the specified warranties.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Portland cement based formulation provided by or recommended by the following. Do not use gypsum based compounds.
 - 1. Carpet manufacturer.
 - 2. Carpet cushion manufacturer.
- B. Carpet Adhesives: Water-resistant, mildew resistant, and nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet:
 - 1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
 - 2. Adhesives shall have a VOC content of 50 g/L or less.
- C. Plastic Coated Fabric Tape (Stretch-In and Double Stick Broadloom Cushion Installations): Woven fabric impregnated with plastic and coated with adhesive having high-tack adhesion forming a secure bond for application to cushion top seams to resist peaking. Provide water-resistant plastic-coated tape which will unwind without adhesive transfer.
- D. Seaming Tape: Hot melt adhesive tape, 6 inches (152 mm) wide, recommended by the carpet mill as suitable for backing specified.
- E. Seaming Cement: Water-resistant and flame-resistant carpet adhesive for sealing raw edges, seaming, reinforcing seams and patching. Provide fast drying, easy spreading carpet seaming adhesive having excellent aging characteristics recommended by the carpet manufacturer.
- F. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
- G. Floor Sealer: Type as recommended and manufactured by the carpet manufacturer for the applications indicated.
 - 1. VOC Limits: Provide floor sealer with VOC content not more than 200 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

- A. Prior to the installation, and at the Contractor's direction, meet at the Project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, the

installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 8.0 "Substrate Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.
- C. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.
 - 1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard (0.84 sq.m) clear plastic test. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).
 - 2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch (9.5 mm) diameter hole approximately 1/4 inch (6.35 mm) deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter or pH paper. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq. m).
 - 3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer's review and written acceptance.
- D. Concrete Subfloors: Verify that concrete slabs comply with the following:
 - 1. Provide one of the following:
 - a. Remove coatings, including curing compounds, existing floor covering adhesive residues, 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 the carpet manufacturer.
 - b. In lieu of mechanical substrate preparation methods the Contractor may utilize floor sealer materials and methods of the types and methods as recommended, in writing, by the carpet manufacturer. Apply sealer in number of coats, and at the spread rate, as required by the carpet manufacturer.
 - 2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.
 - 3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.

- E. Broom and vacuum clean substrates to be covered immediately before installing carpet.
- F. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. 100 Percent Direct Glue Down of Broadloom Carpet: Comply with the manufacturer's instructions, CRI 104, Section 13.0 "Direct Glue-Down," and as required to match the accepted sample installations.
 - 1. Carpet Layout, Cutting and Edge Trim Seaming: Prior to applying adhesives, place seams at locations indicated on accepted shop drawings. All carpet rolls shall be installed in the exact roll number sequence as listed on the carpet rolls. Maintain direction of pattern, texture and lay of pile. Side to end seaming shall not be allowed. All edges of all rolls of carpet shall be finish trimmed prior to laying to assure a perfect seam condition and carpet match. All trimmed edges shall then be treated with latex seaming adhesive to assure that loose and cut yarns are not left to ravel or pull out.
 - a. 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.
 - b. Extend carpet into closets and offsets, and under movable equipment of the rooms and spaces shown or scheduled to receive carpet, including recessed covers within those spaces.
 - c. Provide cutouts as required for removable access covers in substrates except do not cutout for floor closer cover plates. Bind edges neatly and secure to substrate. Cut only 3 sides wherever it is feasible to provide carpet flap in lieu of fully removable cutout.
 - d. At doorways, center seams under door in closed position; do not place seams perpendicular to door frame in direction of traffic through doorway.
 - e. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.
 - f. Seams shall be located away from areas subject to pivoting traffic.
 - 2. Apply adhesive in accordance with adhesive manufacturer's directions.
 - 3. Adhere carpet with a full spread of adhesive. Ensure uniform bond over the entire area.
 - a. Butt carpet tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining rolls of carpet. Seams shall be pressed by hand and/or suitable tool to produce the best possible even top pile width-to-width. Adjacent widths of carpet must be installed to finish at exactly the same elevation.
 - b. Roll carpet uniformly, removing air pockets and bubbles.
 - c. If the pile of the carpet has been compressed while laying in storage, so that there appears to be a difference in color in adjacent widths of material, the Contractor

shall neutralize the pile with a steam machine and obtain a uniform pile direction throughout by brushing the carpet while it is still damp, at no additional cost to the Owner.

4. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by Architect install in single lengths and secure in accordance with manufacturer's directions.
 5. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturer's recommendations.
- B. Double-Stick Installation: Comply with CRI 104, Section 14 "Double Glue-Down" and the carpet manufacturer's recommendations.
- C. Attached Cushion Installation: Comply with CRI 104, Section 15 "Attached Cushion Install" and the carpet manufacturer's recommendations.

3.4 CLEANING AND PROTECTION

- A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.
- B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.
1. Plastic and polyethylene sheet protective coverings shall not be permitted over glue down installations.
 2. Remove and replace rejected carpeting with new carpeting. At the completion of the work and when directed by the Architect, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of the Architect.

END OF SECTION 09 68 16

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes installation of wall coverings and accessories necessary for a complete installation.
- B. Related Requirements:
 - 1. Section 09 29 00 "Gypsum Board" for Levels 4 and 5 finishes required under wallcovering.
 - 2. Section 09 91 23 "Interior Painting" for priming wall surfaces.
- C. Owner-Furnished Materials: Wall coverings, as indicated in Finish Schedule.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
 - 1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F 1141 for appearance shading characteristics.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and

temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265 or NFPA 286.

2.2 WALL COVERING PRODUCTS (WC##)

- A. General: Provide rolls of each type of wall covering from the same run number or dye lot.
- B. Owner-furnished Product(s): As indicated in Finish Schedule on Drawings.

2.3 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. Adhesives shall have a VOC content of 50 g/L or less.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

- C. Metal Primer: Interior ferrous metal primer complying with Section 09 91 23 "Interior Painting" and recommended in writing by primer and wall-covering manufacturers for intended substrate.
- D. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall-covering manufacturer.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
- E. 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL LINER INSTALLATION

- A. Install wall liner, without gaps or overlaps. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.

3.4 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.5 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 80 10 - ACOUSTIC ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes accessory items installed as part of other construction for the purposes of sound reduction and sound control. Final assemblies will be tested for acoustical performance.
- B. Related Requirements:
 - 1. Section 07 92 00 "Joint Sealants" for sealants.
 - 2. Section 09 29 00 "Gypsum Board" for gypsum board installation.
 - 3. Section 09 60 13 "Acoustic Underlayment" for acoustic underlayment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For all items installed as part of other construction. Include details showing sound tight and light-tight construction.
- C. Samples: For each exposed product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Acoustical testing criteria

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site. Invite Architect, subcontractors, acoustical consultant, and product supplier.
- B. Mockups: In acoustically rated walls, mockup one room, test performance of acoustical accessories, and make revisions as needed before proceeding to other rooms and spaces.
- C. Inspection: Provide for fulltime inspection of critical acoustical assemblies.

PART 2 - PRODUCTS

2.1 SOUND CONTROL ACCESSORIES

- A. General: Provide sound control accessories as shown on the Acoustical and Architectural drawings.
- B. Sound Attenuation Blankets: Refer to Section 09 29 00 "Gypsum Board."
- C. Acoustical Joint Sealant: Refer to Section 09 29 00 "Gypsum Board."
- D. Sheet Calking for Junction Boxes: Subject to compliance with requirements, provide one of the following:
 - 1. Lowry's "Electrical Box Sealer" (800-772-2521).
 - 2. Tremco Sheet Calking (800-321-7906).
- E. Sheet Calking for Junction Boxes at Fire Rated Assemblies: Subject to compliance with requirements, provide one of the following:
 - 1. Firestop Putty Pads by Hevi-Duty/Nelson (800-331-7325).
 - 2. Specified Technologies Inc. (800-992-1180).
 - 3. HILTO CP-617 (800-879-8000).
- F. Backing Rod: Closed cell neoprene rod or polyethylene film.
- G. Compressible Foam Gaskets: 3/8 inch thickness; 6 pack density compressible foam with one-side high-tack adhesive; Norseal V-730.
- H. Expanding Foam Sealant: Subject to compliance with requirements, provide one of the following:
 - 1. UL Class I Fire Retardant Polycell Expanding Foam by Macklanburg Duncan (800-348-3571).
 - 2. Great Stuff Pro- Gaps & Cracks by Dow (800-800-3626)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install acoustical accessories as part of installation of full assembly.
 - 1. Install sealants, gaskets and calking so that entire assembly is "light tight" at areas of installation.
 - 2. Install accessories to prevent vibration, rattles or other movement not intended as part of the assembly.

3. Do not install items back to back in wall cavities.
- B. Provide ongoing observation and testing as assemblies are installed.
- C. Clean items on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions and requirements of acoustical consultant.

END OF SECTION 09 80 10

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paint systems on the following interior substrates:
1. Gypsum board.
 2. Steel.
 3. Galvanized metal.
 4. Wood.

1.2 DEFINITIONS

- A. General: The following terms apply to this Section. Gloss level shall be determined according to ASTM D 523.
1. Gloss Level 1(Flat, or Matte): Not more than 5 units at 60 degrees and 10 units at 85 degrees.
 2. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
 3. Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 4. Gloss Level 4 (Satin or Low Luster): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
 5. Gloss Level 5 (Semigloss): 35 to 70 units at 60 degrees.
 6. Gloss Level 6 (Gloss): 70 to 85 units at 60-degrees.
 7. Gloss Level 7 (High Gloss): More than 85 units at 60 degrees.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat, with texture to simulate actual conditions.
1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required gloss, color, and texture are achieved.
 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
 3. Submit paint samples on hardboard, 12 inches (305 mm) square, of each color and texture required.

- C. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 1 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Sample Installation: Apply sample installation of each paint system indicated and each color and finish selected to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in sample installations unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore Family of Products (Benjamin Moore, Coronado, Corotech, Insl-x, LenMar)
 2. PPG Paints (PPG)
 3. Sherwin-Williams Co. (SW)
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers.

2.2 PAINT, GENERAL (PT##)

- A. Material Compatibility: Provide materials for use within each paint system that are compatible with one another and with the substrates indicated, under conditions of service and application, as demonstrated by manufacturer based on testing and field experience. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Nonflat Paints and Coatings: VOC content of not more than 100 g/L.
 3. Dry Fog Coatings: VOC content not more than 150 g/L.
 4. Primers, Sealers, and Undercoaters: VOC content not more than 100 g/L.
 5. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content not more than 250 g/L.
 6. Zinc-Rich Industrial Maintenance Primers: VOC content not more than 340 g/L.
 7. Pre-Treatment Wash Primers: VOC content not more than 420 g/L. Floor Coatings: VOC content not more than 100 g/L.
 8. Shellacs, Clear: VOC content not more than 730 g/L.
 9. Shellacs, Pigmented: VOC content not more than 550 g/L.
- C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- D. Colors and Gloss: As indicated in Finish Schedule on Drawings. Reference to a particular manufacturer's number or color name is used only as a convenience for the Architect in order to establish the Project color and gloss requirements. These references are not intended to describe the required generic paint systems. For generic paint system requirements, refer to the "Interior Paint Schedule" at the end of Part 3, as applicable to the respective conditions of use.
1. The selection of paint colors and gloss are indicated by manufacturer and color type; designated as "PT##."
 2. Furnish the same lots, batches, etc. within the same contiguous areas of the building (i.e., corridors on the same floors, common rooms which adjoin each other, etc.).

2.3 PREPARATORY COATS

- A. Primer Sealer, Latex, Interior:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; Speedhide Zero Interior Latex Sealer Quick-Drying (6-4900).
 3. SW; ProMar 200 Zero VOC Interior Latex Primer (B28W02600).
- B. Primer, Latex, for Interior Wood:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; SEAL GRIP Interior Primer/Finish (17-951).
 3. SW; Premium Wall & Wood Interior Latex Primer (B28W08111).
- C. Primer, Acrylic:
1. Benjamin Moore; Super Spec HP Acrylic Metal Primer (P04).
 2. PPG; Pitt Tech Interior/Exterior Primer/Finish DTM Industrial Primer (90-712).
 3. SW; Pro Industrial Pro-Cryl Universal Primer (B66-310 Series).
- D. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.4 WATER-BASED PAINTS

- A. Latex, Interior, Gloss Level 1 (Flat):
1. Benjamin Moore; Ultra Spec 500 Interior Flat (N536).
 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Flat (6-4110XI).
 3. SW; ProMar 200 Zero VOC Interior Latex Flat (B30-2600 Series).
- B. Latex, Interior, Gloss Level 3 (Eggshell).
1. Benjamin Moore; Ultra Spec 500 Interior Eggshell (N538).
 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Eggshell (6-4310XI).
 3. SW; ProMar 200 Zero Interior VOC Latex Eg-Shel (B20-2600 Series).

- C. Latex, Interior, Gloss Level 5 (Semigloss):
 - 1. Benjamin Moore; Ultra Spec 500 Interior Semi-Gloss (N539).
 - 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Semi-Gloss (6-4510XI).
 - 3. SW; ProMar 200 Zero VOC Latex Semi-Gloss (B31-2600 Series).

- D. Latex, Interior, High Performance Architectural, Gloss Level 3 (Eggshell):
 - 1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy Eggshell V342.
 - 2. PPG; Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy (16-310).
 - 3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Eg-Shel (K45-150 Series).

- E. Latex, Interior, High Performance Architectural, Gloss Level 5 (Semigloss):
 - 1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy SG (V341).
 - 2. PPG; Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy (16-510).
 - 3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss (K46-150 Series).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with manufacturer's requirements for paint application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

3.2 PREPARATION

- A. Remove hardware and hardware accessories, cover plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible, provide surface-applied protection before surface preparation and painting.
- B. Before applying paint or other surface treatments, clean substrates of substances that could impair bond of paints. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime.

1. Gypsum Wallboard: Repair all surfaces in gypsum wallboard with wallboard joint finishing compound or spackling compound, filled out flush and sanded smooth. Clean all surfaces and taped joints of dust, dirt and other contaminants and be sure they are thoroughly dry before applying paint.
 2. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 3. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
 4. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 5. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
- D. Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in Finish Schedule on Drawings.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 4. Extend coatings in exposed surfaces, as required, to maintain system integrity and provide desired protection.

- a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint front and back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces. Paint access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling cover plates and other items in painted areas to match the areas in which they occur unless otherwise directed by the Architect.
- B. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - a. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - b. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 - c. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 2. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

- 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. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
 - a. Color: Flat (gloss level 1), nonspecular, black.
- G. Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 MARKING AND IDENTIFICATION

- A. Mark fire-rated and smoke-rated partitions required to have protective openings or penetrations.
 - 1. Locate markings in accessible concealed floor, floor-ceiling, or attic spaces.

2. Provide markings within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the partition.
3. Marking shall include stenciled lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke.
4. Apply markings in a contrasting color with the suggested wording "FIRE AND/OR SMOKE BARRIER---PROTECT ALL OPENINGS", or other wording as approved by the Authority Having Jurisdiction.

B. Mark sound-rated partitions as follows:

1. Locate markings in accessible concealed floor, floor-ceiling, or attic spaces.
2. Provide markings within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the partition.
3. Marking shall include stenciled lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke.
4. Apply markings in a contrasting color with the suggested wording "STC Value as indicated on Drawings PARTITION---PROTECT ALL OPENINGS", or other wording as approved by the Owner.

3.5 CLEANING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.
- C. After completing painting operations in each space or area, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection, if any.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from paint application. Correct damage to work of other trades by cleaning, repairing or replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board Substrates:
 1. Latex System:

- a. Primer: Sealer, latex, interior.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior (gloss as indicated in Finish Schedule).

B. Steel Substrates:

1. High-Performance Architectural Latex System:

- a. Primer: Acrylic.
- b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

C. Steel (Factory-Primed) Substrates:

1. High-Performance Architectural Latex System:

- a. Primer: Acrylic (applied over factory primer).
- b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

D. Galvanized Metal Substrates:

1. High-Performance Architectural Latex System:

- a. Primer: Acrylic.
- b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

E. Wood Substrates:

1. High-Performance Architectural Latex System:

- a. Primer: Acrylic.
- b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

END OF SECTION 09 91 23

SECTION 10 28 00 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Private-use bathroom accessories.
 - 2. Private-use shower accessories.
- B. Owner-furnished, Contractor-installed items: As indicated on Drawings.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Samples: Full size, for each exposed product and for each finish specified.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PRIVATE-USE BATHROOM ACCESSORIES

- A. Source Limitations: Obtain private-use bathroom accessories from single source from single manufacturer.
- B. Basis of Design: Provide products indicated in schedule on Drawings.

2.3 PRIVATE-USE SHOWER ACCESSORIES

- A. Source Limitations: Obtain private-use shower accessories from single source from single manufacturer.
- B. Basis of Design: Provide products indicated in schedule on Drawings.

2.4 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 28 19 - TUB AND SHOWER DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes framed shower doors and enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for shower doors and enclosures.
- B. Shop Drawings: For tub and shower doors and enclosures. Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For tub and shower doors and enclosures.
 - 1. Each type of mounting and operating hardware; full size.
 - 2. Glass and glazing; 12 inches (305 mm) square.
 - 3. Trim; 12-inch (305-mm) lengths.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For tub and shower doors and enclosures to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 - 1. Build mockup of tub and shower doors and enclosure as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

- A. Verify dimensions by field measurements before fabrication and indicate on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of tub and shower doors and enclosures that fail in materials or workmanship within specified warranty period without monetary limitation.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FRAMED ENCLOSURES

- A. Glass panels with full perimeter frames of extruded aluminum with screw-fastened corners. Minimum 3/8-inch (10-mm) penetration of glass into frame. Framing members of thickness required to support imposed loads.
 1. Basis-of-Design Product: C. R. Lawrence Co.
- B. Frames, Hardware, and Trim: Manufacturer's standard units as indicated and as required for a complete installation.
 1. Materials: Aluminum; ASTM B 221 (ASTM B 221M).
 2. Finish: Clear anodic.
- C. Swinging Doors: Hinges, pulls and other hardware as indicated on Drawings.
- D. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- E. Glazing: Safety glazing materials complying with 16 CFR 1201, Category II, with permanently etched identification acceptable to authorities having jurisdiction.
 1. Glass Nominal Thickness: 3/8 inch (10 mm).
- F. Fasteners: Manufacturer's standard stainless-steel or other noncorrosive fasteners.

- G. Sealant: Mildew-resistant, single-component, nonsag, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, for Use NT. Refer to Section 07 92 00 "Joint Sealants."
 - 1. Sealant shall have a VOC content of 250 g/L or less.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare and install as recommended in manufacturer's written instructions unless more stringent requirements are contained in GANA's "Glazing Manual."
- B. Clean substrates, removing projections, filling voids, and sealing joints.
- C. Set units level, plumb, and true to line, without warp or rack of frames and panels, and anchor securely in place.
- D. Fasten components securely in place, with provisions for thermal movement. Install with concealed fasteners unless otherwise indicated.
- E. Install components to drain and return water to tub or shower.
- F. Install doors to produce smooth operation and tight fit at contact points.
- G. Repair, refinish, or replace components damaged during installation.

3.2 ADJUSTING AND CLEANING

- A. Adjust operating parts and hardware for smooth, quiet operation and watertight closure. Lubricate hardware and moving parts.
- B. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 10 28 19

SECTION 12 22 00 - CURTAINS AND DRAPES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes installation of the following Owner-furnished items:
 - 1. Drapes.
 - 2. Drapery tracks.

1.2 ACTION SUBMITTALS

- A. Shop Drawings:
 - 1. Drapery Tracks: Show installation and anchorage details and locations of controls.
 - 2. Drapes: Show sizes, locations, and details of installation.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For drapery track installation; reflected ceiling plans drawn to scale and coordinating track installation with openings and ceiling-mounted items, on which the following items are shown:
 - 1. Suspended ceiling components.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup at location and in size shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before drape fabrication, and indicate measurements on Shop Drawings.
- B. Scheduling: Do not deliver or install drapes until after other finish work, including painting, is complete and spaces are otherwise ready for occupancy.

PART 2 - PRODUCTS

2.1 DRAPERY TRACKS

- A. Owner-furnished, Contractor-installed.

2.2 DRAPES

- A. Owner-furnished, Contractor-installed.

PART 3 - EXECUTION

3.1 DRAPERY TRACK INSTALLATION

- A. Install track systems according to manufacturer's written instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.
- B. Isolate metal parts of tracks and brackets from concrete, masonry, and mortar to prevent galvanic action. Use tape or another method recommended in writing by track manufacturer.

3.2 DRAPE INSTALLATION

- A. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 1/4 inch (6.4 mm).
- B. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm).
- C. Where drapes extend to windowsill, install so that bottom hems hang above sill line and clear sill line by not more than 1/2 inch (13 mm).

3.3 ADJUSTING

- A. After hanging drapes, test and adjust each drapery track to produce unencumbered, smooth operation.
- B. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.
- C. Remove and replace drapes that are stained or soiled.

END OF SECTION 12 22 00

SECTION 12 36 40 - STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes stone countertops and backsplashes.
- B. Related Requirements:
 - 1. Section 06 40 23 "Interior Architectural Woodwork" for base cabinets and wood trim.

1.2 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
 - 1. Include submittal of stone sealer manufacturer's recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone countertop materials.
- B. Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of stone units, arrangement and provisions for jointing, supporting, anchoring and bonding stonework, and other details showing relationships with, attachment to, and reception of, related work. Stone delivered to the jobsite, or installed, and which does not fall within the accepted sample range, may be subject to removal and replacement with stone that falls within the accepted sample range at no cost to the Owner.
 - 1. Include plans, sections, details, and attachments to other work.
 - 2. Show locations and details of joints.
 - 3. Show direction of veining, grain, or other directional pattern.
- C. Samples for Verification:
 - 1. For each stone type indicated, in sets of Samples not less than 12 inches (300 mm) square. Include three or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Test Reports:
 - 1. Stone Test Reports: For each stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, according to referenced ASTM standards. Base reports on testing done within previous five years.

- B. Product Certificates: Submit manufacturers' certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this Specification.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For stone countertops to include in maintenance manuals. Include product data for stone-care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate stone countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications:
 - 1. Subcontract the stonework to a single firm with a minimum of 10 years successful experience in conventional set stonework comparable to that shown and specified, in not less than 3 projects of similar scope to the satisfaction of the Architect. The stonework includes, but is not necessarily limited to, the following:
 - a. All preparation for stonework, including but not limited to, submittals, site erection, and sample installations as specified herein.
 - b. Interior countertops.
 - c. All anchors, supports, inserts and fasteners for the above, fabrication and installation of same.
 - d. All sealants and joint fillers in conjunction with the above.
 - 2. The connection system as shown is suggested for the stone installation. Final connection design is the sole responsibility of the Contractor. Coordinate the location of connectors to be placed in stone with connectors to be built into woodwork backup.
- C. Field-Constructed Sample Installations: After review of samples, acceptance of shop drawings, prepare sample installations for the following types of stonework. Purpose of sample installations is in establishing standard of quality for stone jointing and workmanship expected in completed Work. Build sample installations to comply with following requirements:
 - 1. Locate sample installations on site where indicated or, if not indicated, as directed by Architect.
 - 2. Build sample installations of the following Work:
 - a. Typical interior countertop installation.
 - 3. Retain sample installations during construction as a standard for judging completed stonework. Do not alter, move or destroy sample installations until Work is completed.

Accepted sample installations may become part of the completed Work if undisturbed at time of Substantial Completion. Rejected sample installations shall be completely demolished, removed and replaced until accepted.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Adhesion and Compatibility Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 07 92 00 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project in undamaged condition.
- B. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.
 - 1. Do not use pinch or wrecking bars.
 - 2. Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.
 - 3. Store stones on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.
 - 4. Protect stone on wood skids or pallets, covered with non-staining, waterproof membrane, but allow air to circulate around stones.
 - 5. Store cementitious materials off the ground, under cover and in dry location.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive stone countertops by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 STONE, GENERAL

- A. Comply with referenced standards and other requirements indicated applicable to each type of material required.
- B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.

- C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:
1. Color Range: Matching Architect's samples; uniform with no discernable variations between pieces in any contiguous area.
 2. Finishing Technique:
 - a. Polished Finish: Uniform highly reflective mirror gloss finish with the full color and crystal structure of the stone visible through the finish. Evidence of swirl shall not be permitted.
 - b. Honed Finish: Uniform throughout. Evidence of swirl shall not be permitted.
 - c. Thermal (Flamed) Finish: Uniform textured finish produced by the application of a high temperature flame to the stone surface with all panels processed horizontally (parallel) to grade unless otherwise accepted by the Architect on the shop drawings. Evidence of channeling shall not be permitted.

2.2 STONE TYPES (ST##)

- A. General: Comply with ASTM C 615 for granite, and as follows. Stone shall be sound, durable, and free of imperfections such as spalls, cracks, starts, seams, pits, stain producing minerals, and other defects that will impair its strength, durability and appearance. All material shall be subject to culling as required to match Architect's preselected control samples prior to acquisition and thereafter through all stages of fabrication prior to delivery.
- B. Association Standard for Quality and Fabrication:
1. "Design Manual VII" of Marble Institute of America (MIA).
 2. "Specifications for Architectural Granite" as published by the National Building Granite Quarriers Association (NBGQA).
- C. Species, Finishes, and Suppliers: Provide stone matching the Architect's samples which have been selected from the product lines, suppliers, and quarriers, indicated in Finish Schedule on Drawings.

2.3 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES

- A. General: Use only adhesives formulated for stone and ceramic tile and that are recommended by their manufacturer for the application indicated.
- B. Water-Cleanable Epoxy Adhesive: ANSI A118.3.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.

- c. MAPEI Corporation.
- C. Stone Seam Adhesive for Countertops: A two-component epoxy or polyester, having high wetting properties, specifically recommended in writing by the epoxy or polyester manufacturer for interior use, stone to stone joints, and for bedding stone anchors. Flowable or pourable paste grade consistency as selected by fabricator for condition of use. Provide adhesive in custom color to match selected stone. Adhesive shall have a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Joint Sealant for Countertops: 'Mildew Resistant Silicone sealant' as specified in Section 07 92 00 "Joint Sealants."
- E. Stone Cleaner: Specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- F. Countertop Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, Hallandale, FL, (800) 424-2HMK or (415) 643-5603, or (954) 964-1658.
 - 1. Impregnator: Low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, lipstick, wine, and hand cream lotion infiltration.
 - a. S34N Silicone Impregnator for factory sealing of stone countertop units, if field finishing stone countertops use S32 Silicone Impregnator.
 - 2. Surface Protection Coating: No-rinse type, 100 percent natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.
 - a. P24 Liquid Stone Soap "No Rinse."
 - 3. Prepare countertop surfaces to receive sealer in accordance with the countertop sealer manufacturer's recommendations. Apply sealers and surface protection coatings in accordance with the countertop sealer manufacturer's instructions.
- G. Countertop Framing Supports: Refer to Section 05 50 00 "Metal Fabrications."
- H. Countertop Underlayment: Refer to Section 06 10 53 "Miscellaneous Rough Carpentry" for toilet room countertops, refer to Section 06 40 23 "Interior Architectural Woodwork" for base cabinet construction to receive stone countertops.

2.4 STONE FABRICATION

- A. General: Fabricate interior stone facing in sizes and shapes required to comply with requirements indicated, including details on Drawings and shop drawings.
1. Unless otherwise shown, provide square edges typically, with quirk mitered outside corners at stone to stone joints, to the extent indicated.
- B. Accurately cut, dress, drill, fit and finish stonework to shapes, profiles and dimensions shown on Drawings and/or final shop and setting drawings. Make exposed surfaces straight, sharp, true and continuous at joints within the tolerances specified.
1. Stone Sizes: As indicated.
 2. Stone Thicknesses:
 - a. Woodwork Tops: 3/4 inch (19 mm), unless otherwise shown.
 3. Fabrication Tolerances:
 - a. Size and Squareness:
 - 1) Unit Thickness of 3/4 inch (19.05 mm) to 1-1/2 inch (38 mm): +/- 1/8 inch in 8 feet (3 mm in 2438 mm).
 - 2) Unit Thickness of Greater than 1-1/2 inch (38 mm): +/- 1/4-inch in 8 feet (6 mm in 2438 mm).
 - b. Thickness:
 - 1) Stone Tiles 3/4 inch (19.05 mm) Thick or Greater, All Finishes: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.6 mm), minus 0 inches.
 4. Cut all joints and edges square and at right angles to face, and with backs parallel to face. Cut kerfs, reveals, and rustications as shown. Make arrises straight, sharp, true, and continuous at joints.
 - a. Where overlapped stone joints occur, finish stone edge to match stone panel face.
 5. Cut and drill stones in shop as required for supports, dowels, shims, anchors, and other inserts as required for rigid and secure installation.
 - a. Predrilled holes for the attachment of mechanical anchors shall be diamond cored jig drilled; dry (impact) drilling of holes shall not be permitted.
 - b. Backcheck kerfs as required to accept stone supports and to provide maximum working joint clearance at panel to panel joints.
 - c. The bottom of any hole or slot for anchor insertion shall not be less than 1/2 inch (12.7 mm) from exposed panel face.
 6. Clean sawn stones to remove rust stains and free iron particles.

- C. Provide greater stone thickness than indicated where thicknesses indicated are insufficient for the sizes or where extent of cutouts shown decreases effective strength of the remaining material, or for proper and sufficient anchorage, suitable and adequate bearing areas or surfaces. Coordinate with Work of other affected trades.
- D. Finish exposed faces and edges of stones to comply with requirements indicated for finish under each type and application of stone required and to match approved samples and field constructed sample installations.
- E. Stone Countertops:
 - 1. Undercounter Lavatories: Make cutouts for undercounter lavatories in shop using template or pattern furnished by lavatory manufacturer. Form cutouts to smooth, even curves with edges at right angles to top. Ease juncture of cutout edges with tops, and finish edges to match tops.
 - 2. Fittings: Factory core countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items provided under Section 10 28 00 "Toilet and Bath Accessories" and Sections pertaining to plumbing.
 - 3. All stone countertop aprons shall be adhesively joined to the countertops using epoxy adhesive. Maximum adhesive joint width shall be limited to 1/16 inch (1.5 mm).
 - a. Prior to cleaning, lightly abrade stone surfaces to be bonded.
 - b. Cleaning: Stone shall be dry and clean from grease, oil, dirt, water, and loose particles.
 - c. Precondition stone to be joined with adhesive to a temperature which is within the temperature range recommended by the adhesive manufacturer for assembling and curing the adhesive.
 - d. Mix adhesive in parts by weight, or parts by volume, in strict accordance with the adhesive manufacturer's instructions.
 - e. Stone countertops shall be assembled and cured, within the temperature range, and under the humidity conditions, recommended by the adhesive manufacturer. Apply adhesive, and brace, or use jiggling, to maintain proper alignment of joined stone pieces until adhesive hardens. Remove adhesive from the stone faces which are to remain exposed in the finished Work.
 - f. Assembled countertops shall not be moved until the adhesive has cured to ensure the absence of joint slippage.
 - g. Apply bracing to the assembled countertops to ensure that the assembled countertops are free of torsional stress during transportation, handling and storage.
- F. Carefully inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material and fabrication; replace defective stones with stones that do comply.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

- A. Prior to the installation of stone, and at the Contractor's direction, meet at the Project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, stone installer, stone and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates to receive stone countertops and conditions under which stone countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone countertops.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone countertops.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Advise installers of other work about specific requirements for placement of inserts and similar items to be used by stone countertop Installer for anchoring stone countertops. Furnish installers of other work with Drawings or templates showing locations of these items.
- B. Before installing stone countertops, clean dirty or stained stone surfaces by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives. Allow stone to dry before installing.

3.4 CONSTRUCTION TOLERANCES

- A. Variation from Level: Do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch (6 mm) maximum.
- B. Variation in Joint Width: Do not vary joint thickness more than one-fourth of nominal joint width.
- C. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.

- D. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.

3.5 INSTALLATION OF COUNTERTOPS

- A. General: Install countertops by adhering to supports with water-cleanable epoxy adhesive.
- B. Do not cut stone in field unless otherwise indicated. If stone countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- C. Set stone to comply with requirements indicated. Shim and adjust stone to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and other attachments indicated or necessary to secure stone countertops in place.
- D. Bond joints with stone adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in stone edges at joints. Fill kerfs with stone adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Use power saws with diamond blades to cut stone. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- F. Apply sealant to joints; comply with Section 07 92 00 "Joint Sealants." Remove temporary shims before applying sealant.

3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Remove and replace stone countertops of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective countertops.
 - 3. Defective joints, including misaligned joints.
 - 4. Interior stone countertops and joints not matching approved Samples and mockups.
 - 5. Interior stone countertops not complying with other requirements indicated.

- C. Replace in a manner that results in stone countertops matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Clean stone countertops no fewer than six days after completion of installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.
- E. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions.

END OF SECTION 12 36 40