

Project Manual

FOR

JOHN L. WYATT
TENANT IMPROVEMENT

TENANT

TOMBSTONE USD #1



TOMBSTONE UNIFIED SCHOOL DISTRICT OFFICE

Emc2 Group Project No. 15321795.00

DATE: June 22, 2021



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See Drawing Specification sheets

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Not Used

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Not Used

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Not Used

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HAZARDOUS MATERIAL DATA

**CONTRACTOR RESPONSIBLE TO ABATE HAZARDOUS MATERIALS DISTURBED
BY THE PROJECT WORK IN ACCORDANCE WITH HCM REPORT
INCLUDED AS PART OF BID DOCUMENTS, INCLUDING ALL
CERTIFICATIONS AND INSPECTIONS/ REPORTS.**

REPORT ATTACHED

END OF SECTION

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SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: John L Wyatt, Tenant Improvement.

1. Project Location: Tombstone, Arizona.

B. Owner: Tombstone Unified School District #1.

1. Owner's Representative: Robert Devere.

C. Architect: Emc2 Group Architects Planners, PC.

1. Architect's Representative: Jason Fowers, (480) 830-3838, jfowers@emc2architects.com.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Interior remodel and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single JOC contract.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- C. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits on Use of Site: Confine construction operations to areas as coordinated with Owner.
 - 2. Driveways, Walkways, and Entrances: Keep driveways loading areas, 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 for storage of materials.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- E. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing adjacent building(s) 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 day-to-day operations. Maintain existing exits unless otherwise indicated.

1.6 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to working hours as coordinated with the Owner.
- C. Existing Utility Interruptions: 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 Architect/Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
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.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products alcoholic beverages, and other controlled substances on Project site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 01 21 00 "Allowances" for procedures for using unit prices to adjust quantity allowances.

1.2 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1 – Glue-Laminated Wood Roof Decking:

1. Description: Replacement of damaged glue-laminated wood roof decking according to Section 06 15 16 "Wood Roof Decking."
2. Unit of Measurement: Square foot.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."

B. Unit Price No. 2 – Solid-Sawn Wood Roof Decking:

1. Description: Replacement of damaged plywood roof decking according to Section 06 15 16 "Wood Roof Decking."
2. Unit of Measurement: Square foot.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."

C. Unit Price No. 3 – Wood Fascia Board:

1. Description: Replacement of damaged 2x wood fascia board (to match existing, field verify) according to Section 06 10 53 "Miscellaneous Rough Carpentry."
2. Unit of Measurement: Linear Foot.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."

END OF SECTION

SECTION 01 26 16
REQUEST FOR INFORMATION / INTERPRETATION FORM

PROJECT: John L Wyatt, Tenant Improvement

R.F.I NUMBER: _____

From: _____

To: _____

DATE: _____

Emc2 Project Number: #15321795.00

Specification Section / Paragraph: _____

Drawing Reference / Detail: _____

REQUEST:

*Requested Date for Response: _____

Signed by: _____

RESPONSE:

ATTACHMENTS:

*Date Returned: _____

Signed by: _____

Copies to: File Owner Consultant(s) _____

* Contractor shall allow up to 5 working days review and response time for RFI'S, unless review is required of multiple consultants, then the review and response period shall be 7 working days.

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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.

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 items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

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.
- B. Payment Application Times: Submit Application for Payment to Architect by the 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. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Site mobilization meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Progress report and photographs.
- F. Coordination drawings.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Submittal procedures.

1.02 PROJECT COORDINATION

- A. Cooperate with the Owner's Project Coordinator in allocation of mobilization areas of site; for field offices and sheds (if applicable), for construction access, traffic, and parking facilities.
- B. During construction, coordinate use of site and facilities through the Project Coordinator.
- C. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- D. Comply with instructions of the Owner's Project Coordinator for use of temporary utilities and construction facilities.
- E. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Coordination drawings.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. The Owner and/or Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.

3. Contractor.
 4. Roofing Product Supplier.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties in Contract, and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Recorded minutes will be distributed within two days after meeting to all participants; Architect, Owner, Contractor, other participants, and all others affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on progress schedule and coordination.
 11. Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS REPORTS

- A. Prepare and maintain weekly progress reports reflecting weekly progress, throughout the course of the project. Report will reflect daily activities, work accomplished, and trades involved.
- B. Reports will include progress photographs reflective of the work in-place.
- C. Submit copies of weekly progress reports with photographs, weekly, to Owner and Architect.
- D. Include all progress reports with closeout documents submitted to the Owner at the conclusion of the contract.

3.04 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

3.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection (as applies).
 - 4. Samples for verification (as applies).
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. If requested by Owner, Contractor to provide Owner with copy of all submittals concurrent with Architect.
- D. Samples will be reviewed only for aesthetic, color, or finish selection.
- E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

3.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout in accordance with Section 01 77 00.:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.

3.08 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 - 1. Small Size Sheets, not larger than 8-1.2 x 11 inches: Submit six copies to the Architect for review.
 - 2. Larger Sheets, Not Larger than 36 x 48 inches: Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

3. In lieu of 1 and 2 above, PDF electronic file is also acceptable and preferred.
- B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one complete set of reviewed submittals for Owner's use.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810 or other formatted transmittal form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- H. Provide space for Contractor and Architect review stamps.
- I. When revised for resubmission, identify all changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for 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."

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list 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.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of firm or entity that prepared submittal.
5. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
6. Submittal purpose and description.

7. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
8. Other necessary identification.
9. Remarks.
10. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Paper Submittals:

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
2. Provide a space approximately **6 by 8 inches** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
5. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using AIA Document G810 transmittal form.

E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

F. Submittals for Utilizing Web-Based Project Management Software: Prepare submittals as PDF files, or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
2. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

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 unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- 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. 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 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Resubmittal Review: Allow 7 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Notation of coordination requirements.
 4. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Compliance with specified standards.
 - c. Notation of coordination requirements.
 - d. Notation of dimensions established by field measurement.
 - e. Relationship and attachment to adjoining construction clearly indicated.
 - f. Seal and signature of professional engineer if specified.
 2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches**, but no larger than **24 by 36 inches**.
 - a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
 - b. opaque copies of each submittal. Architect will retain copies; remainder will be returned.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
 4. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 5. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
 6. 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.

7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

3. **Manufacturer Certificates:** Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. **Material Certificates:** Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. **Product Certificates:** Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. **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.

H. **Test and Research Reports:**

1. **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 substrate preparation and primers required.
2. **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.
3. **Material Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. **Product Test Reports:** Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

1.7 **CONTRACTOR'S REVIEW**

- A. **Action Submittals 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. **Contractor's Approval:** Indicate Contractor's approval for each submittal with a uniform approval stamp indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
 - a. .
 - 2. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
 - a. .
 - 3. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
 - a. Actions taken by indication on Project management software website have the following meanings:
 - 1) .
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection 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. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described 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.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. 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, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
 - 1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.

- d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
 - 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 - 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is 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 ACTION SUBMITTALS

1.5 INFORMATIONAL SUBMITTALS

1.6 REPORTS AND DOCUMENTS

- A. 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. Statement on condition of substrates and their acceptability for installation of product.
 2. Statement that products at Project site comply with requirements.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- B. 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. Statement that equipment complies with requirements.
 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 3. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- E. 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.

1.8 QUALITY CONTROL

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

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

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. [AABC - Associated Air Balance Council; www.aabc.com.](http://www.aabc.com)
2. [AAMA - American Architectural Manufacturers Association; www.aamanet.org.](http://www.aamanet.org)
3. [AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.](http://www.aapfco.org)
4. [AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.](http://www.transportation.org)
5. [AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.](http://www.aatcc.org)
6. [ABMA - American Bearing Manufacturers Association; www.americanbearings.org.](http://www.americanbearings.org)
7. [ABMA - American Boiler Manufacturers Association; www.abma.com.](http://www.abma.com)
8. [ACI - American Concrete Institute; \(Formerly: ACI International\); www.concrete.org.](http://www.concrete.org)
9. [ACPA - American Concrete Pipe Association; www.concrete-pipe.org.](http://www.concrete-pipe.org)
10. [AEIC - Association of Edison Illuminating Companies, Inc. \(The\); www.aeic.org.](http://www.aeic.org)
11. [AF&PA - American Forest & Paper Association; www.afandpa.org.](http://www.afandpa.org)
12. [AGA - American Gas Association; www.aga.org.](http://www.aga.org)
13. [AHAM - Association of Home Appliance Manufacturers; www.aham.org.](http://www.aham.org)
14. [AHRI - Air-Conditioning, Heating, and Refrigeration Institute \(The\); www.ahrinet.org.](http://www.ahrinet.org)
15. [AI - Asphalt Institute; www.asphaltinstitute.org.](http://www.asphaltinstitute.org)
16. [AIA - American Institute of Architects \(The\); www.aia.org.](http://www.aia.org)
17. [AISC - American Institute of Steel Construction; www.aisc.org.](http://www.aisc.org)
18. [AISI - American Iron and Steel Institute; www.steel.org.](http://www.steel.org)
19. [AITC - American Institute of Timber Construction; www.aitc-glulam.org.](http://www.aitc-glulam.org)
20. [AMCA - Air Movement and Control Association International, Inc.; www.amca.org.](http://www.amca.org)
21. [ANSI - American National Standards Institute; www.ansi.org.](http://www.ansi.org)
22. [AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.](http://www.aosaseed.com)
23. [APA - APA - The Engineered Wood Association; www.apawood.org.](http://www.apawood.org)
24. [APA - Architectural Precast Association; www.archprecast.org.](http://www.archprecast.org)
25. [API - American Petroleum Institute; www.api.org.](http://www.api.org)
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. [ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.](http://www.asphaltroofing.org)
29. [ASCE - American Society of Civil Engineers; www.asce.org.](http://www.asce.org)

30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. [ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.](http://www.ashrae.org)
32. [ASME - ASME International; \(American Society of Mechanical Engineers\); www.asme.org.](http://www.asme.org)
33. [ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.](http://www.asse-plumbing.org)
34. [ASSP - American Society of Safety Professionals \(The\); www.assp.org.](http://www.assp.org)
35. [ASTM - ASTM International; www.astm.org.](http://www.astm.org)
36. [ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.](http://www.atis.org)
37. [AVIXA - Audiovisual and Integrated Experience Association; \(Formerly: Infocomm International\); www.soundandcommunications.com.](http://www.soundandcommunications.com)
38. [AWEA - American Wind Energy Association; www.awea.org.](http://www.awea.org)
39. [AWI - Architectural Woodwork Institute; www.awinet.org.](http://www.awinet.org)
40. [AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.](http://www.awmac.com)
41. [AWPA - American Wood Protection Association; www.awpa.com.](http://www.awpa.com)
42. [AWS - American Welding Society; www.aws.org.](http://www.aws.org)
43. [AWWA - American Water Works Association; www.awwa.org.](http://www.awwa.org)
44. [BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.](http://www.buildershardware.com)
45. [BIA - Brick Industry Association \(The\); www.gobrick.com.](http://www.gobrick.com)
46. [BICSI - BICSI, Inc.; www.bicsi.org.](http://www.bicsi.org)
47. [BIFMA - BIFMA International; \(Business and Institutional Furniture Manufacturer's Association\); www.bifma.org.](http://www.bifma.org)
48. [BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.](http://www.bissc.org)
49. [BWF - Badminton World Federation; \(Formerly: International Badminton Federation\); www.bissc.org.](http://www.bissc.org)
50. [CDA - Copper Development Association; www.copper.org.](http://www.copper.org)
51. [CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking.](http://ec.europa.eu/growth/single-market/ce-marking)
52. [CEA - Canadian Electricity Association; www.electricity.ca.](http://www.electricity.ca)
53. [CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.](http://www.chemicalfabricsandfilm.com)
54. [CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.](http://www.cfsei.org)
55. [CGA - Compressed Gas Association; www.cganet.com.](http://www.cganet.com)
56. [CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.](http://www.cellulose.org)
57. [CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.](http://www.cisca.org)
58. [CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.](http://www.cispi.org)
59. [CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.](http://www.chainlinkinfo.org)
60. [CPA - Composite Panel Association; www.compositepanel.org.](http://www.compositepanel.org)
61. [CRI - Carpet and Rug Institute \(The\); www.carpet-rug.org.](http://www.carpet-rug.org)
62. [CRRRC - Cool Roof Rating Council; www.coolroofs.org.](http://www.coolroofs.org)
63. [CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.](http://www.crsi.org)
64. [CSA - CSA Group; www.csa-group.org.](http://www.csa-group.org)
65. [CSI - Construction Specifications Institute \(The\); www.csiresources.org.](http://www.csiresources.org)
66. [CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.](http://www.cedarbureau.org)
67. [CTA - Consumer Technology Association; www.cta.tech.](http://www.cta.tech)
68. [CTI - Cooling Technology Institute; \(Formerly: Cooling Tower Institute\); www.coolingtechnology.org.](http://www.coolingtechnology.org)

69. CWC - Composite Wood Council; (See CPA).
70. [DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.](http://www.dasma.com)
71. [DHA - Decorative Hardwoods Association; \(Formerly: Hardwood Plywood & Veneer Association\); www.decorativehardwoods.org.](http://www.decorativehardwoods.org)
72. [DHI - Door and Hardware Institute; www.dhi.org.](http://www.dhi.org)
73. ECA - Electronic Components Association; (See ECIA).
74. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
75. [ECIA - Electronic Components Industry Association; www.ecianow.org.](http://www.ecianow.org)
76. EIA - Electronic Industries Alliance; (See TIA).
77. [EIMA - EIFS Industry Members Association; www.eima.com.](http://www.eima.com)
78. [EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.](http://www.ejma.org)
79. [EOS/ESD Association; \(Electrostatic Discharge Association\); www.esda.org.](http://www.esda.org)
80. ESTA - Entertainment Services and Technology Association; (See PLASA).
81. [ETL - Intertek \(See Intertek\); www.intertek.com.](http://www.intertek.com)
82. [EVO - Efficiency Valuation Organization; www.evo-world.org.](http://www.evo-world.org)
83. [FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.](http://www.fluidcontrolsinstitute.org)
84. [FIBA - Federation Internationale de Basketball; \(The International Basketball Federation\); www.fiba.com.](http://www.fiba.com)
85. [FIVB - Federation Internationale de Volleyball; \(The International Volleyball Federation\); www.fivb.org.](http://www.fivb.org)
86. [FM Approvals - FM Approvals LLC; www.fmglobal.com.](http://www.fmglobal.com)
87. [FM Global - FM Global; \(Formerly: FMG - FM Global\); www.fmglobal.com.](http://www.fmglobal.com)
88. [FRSA - Florida Roofing, Sheet Metal Contractors Association, Inc.; www.floridarroof.com.](http://www.floridarroof.com)
89. [FSA - Fluid Sealing Association; www.fluidsealing.com.](http://www.fluidsealing.com)
90. [FSC - Forest Stewardship Council U.S.; www.fscus.org.](http://www.fscus.org)
91. [GA - Gypsum Association; www.gypsum.org.](http://www.gypsum.org)
92. GANA - Glass Association of North America; (See NGA).
93. [GS - Green Seal; www.greenseal.org.](http://www.greenseal.org)
94. [HI - Hydraulic Institute; www.pumps.org.](http://www.pumps.org)
95. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
96. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
97. HPVA - Hardwood Plywood & Veneer Association; (See DHA).
98. [HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.](http://www.hpwhite.com)
99. [IAPSC - International Association of Professional Security Consultants; www.iapsc.org.](http://www.iapsc.org)
100. [IAS - International Accreditation Service; www.iasonline.org.](http://www.iasonline.org)
101. ICBO - International Conference of Building Officials; (See ICC).
102. [ICC - International Code Council; www.iccsafe.org.](http://www.iccsafe.org)
103. [ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.](http://www.icea.net)
104. [ICPA - International Cast Polymer Association; www.theicpa.com.](http://www.theicpa.com)
105. [ICRI - International Concrete Repair Institute, Inc.; www.icri.org.](http://www.icri.org)
106. [IEC - International Electrotechnical Commission; www.iec.ch.](http://www.iec.ch)
107. [IEEE - Institute of Electrical and Electronics Engineers, Inc. \(The\); www.ieee.org.](http://www.ieee.org)
108. [IES - Illuminating Engineering Society; \(Formerly: Illuminating Engineering Society of North America\); www.ies.org.](http://www.ies.org)
109. IESNA - Illuminating Engineering Society of North America; (See IES).

110. [IEST - Institute of Environmental Sciences and Technology; www.iest.org.](http://www.iest.org)
111. [IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.](http://www.igmaonline.org)
112. [IGSHPA - International Ground Source Heat Pump Association; www.igshpa.org.](http://www.igshpa.org)
113. II - Infocomm International; (See AVIXA).
114. [ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.](http://www.iliai.com)
115. [Intertek - Intertek Group; \(Formerly: ETL SEMCO; Intertek Testing Service NA\); www.intertek.com.](http://www.intertek.com)
116. [ISA - International Society of Automation \(The\); \(Formerly: Instrumentation, Systems, and Automation Society\); www.isa.org.](http://www.isa.org)
117. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
118. [ISFA - International Surface Fabricators Association; \(Formerly: International Solid Surface Fabricators Association\); www.isfanow.org.](http://www.isfanow.org)
119. [ISO - International Organization for Standardization; www.iso.org.](http://www.iso.org)
120. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
121. [ITU - International Telecommunication Union; www.itu.int.](http://www.itu.int)
122. [KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.](http://www.kcma.org)
123. LMA - Laminating Materials Association; (See CPA).
124. [LPI - Lightning Protection Institute; www.lightning.org.](http://www.lightning.org)
125. [MBMA - Metal Building Manufacturers Association; www.mbma.com.](http://www.mbma.com)
126. [MCA - Metal Construction Association; www.metalconstruction.org.](http://www.metalconstruction.org)
127. [MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.](http://www.maplefloor.org)
128. [MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.](http://www.metalframingmfg.org)
129. MHI - Material Handling Industry of America; www.mhi.org.
130. MIA - Marble Institute of America; (See NSI).
131. [MMPA - Molding & Millwork Producers Association; www.wmmpa.com.](http://www.wmmpa.com)
132. [MPI - Master Painters Institute; www.paintinfo.com.](http://www.paintinfo.com)
133. [MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.](http://www.mss-hq.org)
134. [NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.](http://www.naamm.org)
135. [NACE - NACE International; \(National Association of Corrosion Engineers International\); www.nace.org.](http://www.nace.org)
136. [NADCA - National Air Duct Cleaners Association; www.nadca.com.](http://www.nadca.com)
137. [NAIMA - North American Insulation Manufacturers Association; www.naima.org.](http://www.naima.org)
138. [NALP - National Association of Landscape Professionals; www.landscapeprofessionals.org.](http://www.landscapeprofessionals.org)
139. [NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.](http://www.nbgqa.com)
140. [NBI - New Buildings Institute; www.newbuildings.org.](http://www.newbuildings.org)
141. [NCAA - National Collegiate Athletic Association \(The\); www.ncaa.org.](http://www.ncaa.org)
142. [NCMA - National Concrete Masonry Association; www.ncma.org.](http://www.ncma.org)
143. [NEBB - National Environmental Balancing Bureau; www.nebb.org.](http://www.nebb.org)
144. [NECA - National Electrical Contractors Association; www.necanet.org.](http://www.necanet.org)
145. [NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.](http://www.nelma.org)
146. [NEMA - National Electrical Manufacturers Association; www.nema.org.](http://www.nema.org)
147. [NETA - InterNational Electrical Testing Association; www.netaworld.org.](http://www.netaworld.org)
148. [NFHS - National Federation of State High School Associations; www.nfhs.org.](http://www.nfhs.org)
149. [NFPA - National Fire Protection Association; www.nfpa.org.](http://www.nfpa.org)
150. NFPA - NFPA International; (See NFPA).
151. [NFRC - National Fenestration Rating Council; www.nfrc.org.](http://www.nfrc.org)

152. [NGA - National Glass Association \(The\); \(Formerly: Glass Association of North America\); www.glass.org.](#)
153. [NHLA - National Hardwood Lumber Association; www.nhla.com.](#)
154. [NLGA - National Lumber Grades Authority; www.nlga.org.](#)
155. [NOFMA - National Oak Flooring Manufacturers Association; \(See NWFA\).](#)
156. [NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.](#)
157. [NRCA - National Roofing Contractors Association; www.nrca.net.](#)
158. [NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.](#)
159. [NSF - NSF International; www.nsf.org.](#)
160. [NSI - National Stone Institute; \(Formerly: Marble Institute of America\); www.naturalstoneinstitute.org.](#)
161. [NSPE - National Society of Professional Engineers; www.nspe.org.](#)
162. [NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.](#)
163. [NTMA - National Terrazzo & Mosaic Association, Inc. \(The\); www.ntma.com.](#)
164. [NWFA - National Wood Flooring Association; www.nwfa.org.](#)
165. [NWWA - National Waste & Recycling Association; www.wasterecycling.org.](#)
166. [PCI - Precast/Prestressed Concrete Institute; www.pci.org.](#)
167. [PDI - Plumbing & Drainage Institute; www.pdionline.org.](#)
168. [PLASA - PLASA; \(Formerly: ESTA - Entertainment Services and Technology Association\); www.plasa.org.](#)
169. [RCSC - Research Council on Structural Connections; www.boltcouncil.org.](#)
170. [RFCI - Resilient Floor Covering Institute; www.rfci.com.](#)
171. [RIS - Redwood Inspection Service; www.redwoodinspection.com.](#)
172. [SAE - SAE International; www.sae.org.](#)
173. [SCTE - Society of Cable Telecommunications Engineers; www.scte.org.](#)
174. [SDI - Steel Deck Institute; www.sdi.org.](#)
175. [SDI - Steel Door Institute; www.steeldoor.org.](#)
176. [SEFA - Scientific Equipment and Furniture Association \(The\); www.sefalabs.com.](#)
177. [SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; \(See ASCE\).](#)
178. [SIA - Security Industry Association; www.siaonline.org.](#)
179. [SJI - Steel Joist Institute; www.steeljoist.org.](#)
180. [SMA - Screen Manufacturers Association; www.smainfo.org.](#)
181. [SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.](#)
182. [SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.](#)
183. [SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.](#)
184. [SPIB - Southern Pine Inspection Bureau; www.spib.org.](#)
185. [SPRI - Single Ply Roofing Industry; www.spri.org.](#)
186. [SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.](#)
187. [SSINA - Specialty Steel Industry of North America; www.ssina.com.](#)
188. [SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.](#)
189. [STI - Steel Tank Institute; www.steeltank.com.](#)
190. [SWI - Steel Window Institute; www.steelwindows.com.](#)
191. [SWPA - Submersible Wastewater Pump Association; www.swpa.org.](#)
192. [TCA - Tilt-Up Concrete Association; www.tilt-up.org.](#)
193. [TCNA - Tile Council of North America, Inc.; www.tileusa.com.](#)
194. [TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.](#)

195. [TIA - Telecommunications Industry Association \(The\); \(Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance\); www.tiaonline.org.](#)
196. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
197. [TMS - The Masonry Society; www.masonrysociety.org.](#)
198. [TPI - Truss Plate Institute; www.tpinst.org.](#)
199. [TPI - Turfgrass Producers International; www.turfgrasssod.org.](#)
200. [TRI - Tile Roofing Institute; www.tilerroofing.org.](#)
201. [UL - Underwriters Laboratories Inc.; www.ul.com.](#)
202. [UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.](#)
203. [USAV - USA Volleyball; www.usavolleyball.org.](#)
204. [USGBC - U.S. Green Building Council; www.usgbc.org.](#)
205. [USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.](#)
206. [WA - Wallcoverings Association; www.wallcoverings.org.](#)
207. [WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.](#)
208. [WCMA - Window Covering Manufacturers Association; www.wcmanet.org.](#)
209. [WDMA - Window & Door Manufacturers Association; www.wdma.com.](#)
210. [WI - Woodwork Institute; www.wicnet.org.](#)
211. [WSRCA - Western States Roofing Contractors Association; www.wsrca.com.](#)
212. [WWPA - Western Wood Products Association; www.wwpa.org.](#)

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

1. [IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.](#)
2. [ICC - International Code Council; www.iccsafe.org.](#)
3. [ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.](#)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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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.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.2 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

1.3 QUALITY ASSURANCE

1.4 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.5 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but 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. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

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.
- B. Related Requirements:
 - 1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.

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. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special

features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

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

1.4 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.

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.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, 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 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 meeting 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. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
 7. 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 may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether the proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: 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 the following requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 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.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's

request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cutting, fitting and patching, including attendant excavation and backfill required to complete Work, and for:
 - 1. Making several parts fit together properly.
 - 2. Uncovering portions of Work to provide for installation of ill-timed Work.
 - 3. Removing and replacing defective and non-conforming Work.
 - 4. Removing samples of installed Work required for testing, as directed by Architect.
 - 5. Providing routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

1.02 SUBMITTALS

- A. In advance of executing any cutting or alterations, submit written request to Architect requesting consent to proceed with cutting which affects:
 - 1. Work of Owner or other trades.
 - 2. Structural value or integrity of any element of Project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Include in request:
 - 1. Identification of Project.
 - 2. Description of affected Work.
 - 3. Necessity for cutting, alteration or excavation.
 - 4. Effect of Work of Owner or other trades, or structural or weatherproof integrity of Project.
 - 5. Description of proposed Work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades which will execute Work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 6. Alternatives to cutting and patching.
 - 7. Cost proposal, when applicable.
 - 8. Written permission of trades whose Work will be affected.
- C. Submit written notice to Architect designating time Work will be uncovered to provide for observation.

1.03 PAYMENT FOR COSTS

- A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of Architect and Engineer to be paid by Contractor.
- B. Cost of Work done on written instructions of Architect, other than defective or nonconforming Work, will be paid by Owner on approval of written Change Order. Provide written cost proposals prior to proceeding with cutting and patching proposed by Architect.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide for replacement of Work removed. Comply with Contract Documents for type of Work standards and Specification requirements for each specific product involved.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling. After uncovering Work, inspect conditions affecting installation of new products and verify procedures with Architect.
- B. Report unsatisfactory or questionable conditions in writing to Architect/Engineer. Do not proceed with Work until further instructions are received.

3.02 PREPARATION

- A. Provide shoring, bracing and supports as required to maintain structural integrity of Work.
- B. Provide devices and methods to protect other portions of Work from damage, including elements which may be exposed by cutting and patching Work. Maintain excavations free from water.

3.03 ERECTION, INSTALLATION AND APPLICATION

- A. Performance:
 - 1. Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.
 - 2. Execute cutting and demolition by methods which prevent damage to other Work to provide proper surfaces to receive installation of repairs and new Work.
 - 3. Execute excavating and backfilling by methods which prevent damage to other Work and settlement as specified in Section 31 01 00.
- B. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants and waterproofing.
 - 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes as shown on Drawings and as specified.
- D. Fit Work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Conform to fire code requirements for penetrations and maintain integrity of fire walls and ceilings.
- E. Restore Work which has been cut or removed. Install new products to provide completed Work in accordance with requirements of Contract Documents and as required to match surrounding areas and surfaces.
- F. Refinish entire surfaces as necessary to provide an even, matching finish as follows:

1. Painted Walls or Ceilings: To nearest intersection with another finish or corner.
2. Where Applied Finishes Occur (i.e wall coverings, tile, wood paneling): To nearest intersection of finish without damage to adjacent material. Where match of pattern, grain, texture, or similar finish cannot be made, refinish area to intersection with other finish or corner.
3. Manufactured or Shop Fabricated Materials: Replace entire affected surface or material.

END OF SECTION

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SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Requirements:
 - 1. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 2. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

1.3 CLOSEOUT SUBMITTALS

1.4 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 5 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to

- services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect . Label with manufacturer's name and model number.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures 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. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 2. Complete final cleaning requirements.
 3. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 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 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.

1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.6 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first , listed by room or space number.
 - 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 - 4. Submit list of incomplete items in the following format:
 - a. MS Excel Electronic File: Architect will return annotated file.
 - b. PDF Electronic File: Architect will return annotated file.
 - c. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).
 - d. Three Paper Copies: Architect will return two copies.

1.7 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit on digital media acceptable to Architect by uploading to web-based project software site by email to Architect.

- D. Warranties in Paper Form:
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive **8-1/2-by-11-inch** paper.
- E. 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. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

- d. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
- e. Vacuum and mop concrete.
- f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
- g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- h. Remove labels that are not permanent.
- i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR.
- m. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- n. Clean strainers.
- o. Leave Project clean and ready for occupancy.

END OF SECTION

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SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect by uploading to web-based project software site by email to Architect. Enable reviewer comments on draft submittals.
 - 2. Submit one paper copies. Architect will return one copies.
- C. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Schedule for routine cleaning and maintenance.
 - 3. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
1. Record Drawings.
 2. Record specifications.
 3. Record Product Data.
- B. Related Requirements:
1. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

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

- B. Record Specifications: Submit one paper copies of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit one paper copies of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Changes made by Change Order or Construction Change Directive.
 - d. Changes made following Architect's written orders.
 - e. Details not on the original Contract Drawings.
 - f. Field records for variable and concealed conditions.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file paper copy scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.5 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

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

1.6 MAINTENANCE OF RECORD DOCUMENTS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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.

1.2 MATERIALS OWNERSHIP

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

1.3 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Pre demolition photographs or video.

1.4 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

1.6 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.

- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Contractor as part of the Work.
- 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.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

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/ASSP 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. Inventory and record the condition of items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

3.3 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.
- B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. 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. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. 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.
 - 4. Maintain fire watch during and for at least a half hours after flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Store items in a secure area until delivery to Owner.

- D. 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.

- E. 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.

3.5 CLEANING

- A. 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.

- B. Burning: Do not burn demolished materials.

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

END OF SECTION

**SECTION 03 05 05
FLY ASH**

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Fly ash admixture for incorporation into concrete mixes specified in the following specification sections:
1. Section 03 10 00 - Cast-In Place Concrete.
 2. Section 04 05 15 - Mortar and Masonry Grout.
 3. Section 32 16 00 - Concrete Curbs, Gutters, Sidewalks and Driveways.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coal Fly Ash and Raw or Calcined Natural Pozzolan
1. Sampled and tested in accordance with the current edition of ASTM C 311, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.
 2. Conform to the requirements of the current edition of ASTM C 618, Standard Specification of Coal Fly Ash and Raw and Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete, as follows:
 - a. Meet the requirements of ASTM C 618, Table 1 Chemical Requirements and Table 1A Supplementary Optional Chemical Requirements.
 - b. Meet the requirements of ASTM C 618, Table 2 Physical Requirements and Table 2A Supplementary Optional Physical Requirements in the following areas:
 - 1) Effectiveness in Controlling Alkali-Silica Reaction.
 - 2) Effectiveness in Contributing to Sulfate Resistance, Procedure A.
 - 3) Uniformity Requirements when air-entraining concrete is specified:
 - c. Air-entrained concrete is not recommended in locations at elevations below 3000 ft. above sea level.
 3. Source Quality Control:
 - a. Fly ash shall come from sources with an established quality control program to demonstrate that the fly ash consistently conforms to ASTM C 618 specification and uniformity requirements. The quality history shall include a minimum of 40 test results representing a minimum of the previous 6 months production of fly ash.
 - b. Per the current edition of ACI 232, Use of Fly Ash in Concrete, section 5.6, the fly ash quality history shall be available that demonstrates at least monthly ASTM C 618 certification results from a Cement and Concrete Reference Laboratory (CCRL) accredited laboratory. A minimum of 20 reports representing at least 6 months of fly ash production is required.
- B. Provide fly ash admixture for incorporation into concrete mixes as specified in the following specification sections:
1. Section 03 30 00 - Cast-In Place Concrete.
 2. Section 04 05 15 - Mortar and Masonry Grout.
 3. Section 32 16 00 - Concrete Curbs, Gutters, Sidewalks and Driveways.

C. Proportioning:

1. Per ACI 232, Use of Fly Ash in Concrete, section 4.1, the most effective method for proper proportioning of concrete for a specific application is by use of a trial batch and testing program per ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete. When necessary, a series of mixtures shall be prepared and tested to determine the proper proportions for the specific project requirements.
2. Fly ash, when used, shall not replace more than 25 percent of cement by weight in accordance with General Structural Notes on Structural Drawings.

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Steel reinforcement bars.
 2. Welded-wire reinforcement.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Each type of steel reinforcement.
 2. Bar supports.
- B. Shop Drawings: Comply with ACI SP-066:
1. Include placing drawings that detail fabrication, bending, and placement.
 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of Architect.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
1. Reinforcement to Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.
- B. Material Certificates: For each of the following, signed by manufacturers:
1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, **Grade 60**, deformed.
- B. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar support's contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
 - b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
 - e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than **16 gauge (0.0508 inch)** in diameter.
 - 1. Finish: Black annealed.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with **ACI 318**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or **24 inches**, whichever is greater.
 - 2. Stagger splices in accordance with **ACI 318**.
 - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
 - 4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed **12 inches**.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches** for plain wire and **8 inches** for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement.
 2. Continue reinforcement across construction joints unless otherwise indicated.
 3. Do not continue reinforcement through sides of strip placements of floors and slabs.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117**.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 03 10 00 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and water-stops.
2. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 31 20 00 "Earth Moving" for drainage fill under slabs-on-ground.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Aggregates.

4. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
5. Vapor retarders.
6. Liquid floor treatments.
7. Curing materials.
8. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Vapor retarders.
5. Joint-filler strips.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:

- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and **ACI 301**.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with **ACI 301** and ACI 306.1.
- B. Hot-Weather Placement: Comply with **ACI 301** and **ACI 305.1**.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with **ACI 301** unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C150/C150M, Type II , .
 - 2. Fly Ash: ASTM C618, Class C or F.
 - 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.

- c. Alkali Content in Concrete: Not more than **4 lb./cu. yd.** for moderately reactive aggregate or **3 lb./cu. yd.** for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with **ACI 301**.
 2. Maximum Coarse-Aggregate Size: Size 67 nominal.
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C330/C330M, nominal maximum aggregate size.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable or complying with ASTM C1602/C1602M, including all limits listed in Table 2 and the requirements of paragraph 5.4

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of 0.01 (gr/ft²/hr/in-Hg); not less than **15 mils** thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. Stego Industries, LLC; Stego Wrap Vapor Barrier (15-Mil)
 - b. W.R. Meadows, Inc; Perminator 15 mil

2.4 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
 - a. Ambient Temperature Below **50 deg F**: Black.
 - b. Ambient Temperature between **50 deg F** and **85 deg F**: Any color.
 - c. Ambient Temperature Above **85 deg F**: White.

- B. Water: Potable or complying with ASTM C1602/C1602M.
- C. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
 - 1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. Euclid Chemical Company (The); an RPM company; Super Diamond Clear VOX.
 - b. Laticrete International, Inc.; L&M Dress and seal WB 25.
 - c. W.R. Meadows, Inc.; Vocomp-30.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber .

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
 - 3. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50.

2.7 CONCRETE MIXTURES

- A. Class A : Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: **ACI 318** .
 - 2. Minimum Compressive Strength: **3000 psi** as indicated at 28 days.

3. Maximum w/cm: 0.50 .
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content:
 - a. All concrete exposed to freezing and thawing and/or required to be watertight shall have an air content of 4.5 to 7.5 percent in accordance with ACI 212.3R. All interior slabs, subject to vehicular abrasion, shall have a maximum air content of 3percent.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.05 percent by weight of cement.

B. Class B : Normal-weight concrete used for foundation walls.

1. Exposure Class: ACI 318 .
2. Minimum Compressive Strength: 3000 psi as indicated at 28 days.
3. Maximum w/cm: 0.50 .
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content:
 - a. All concrete exposed to freezing and thawing and/or required to be watertight shall have an air content of 4.5 to 7.5 percent in accordance with ACI 212.3R. All interior slabs, subject to vehicular abrasion, shall have a maximum air content of 3percent.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.05 percent by weight of cement.

C. Class C : Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: ACI 318 .
2. Minimum Compressive Strength: 3000 psi as indicated at 28 days.
3. Maximum w/cm: 0.40 - 0.45.
4. Minimum Cementitious Materials Content.
5. Slump Limit: 4 inches, plus or minus 1 inch.
6. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
7. Limit water-soluble, chloride-ion content in hardened concrete to 0.05 percent by weight of cement.

D. Class I : Normal-weight concrete used for interior metal pan stairs and landings:

1. Exposure Class: ACI 318.
2. Minimum Compressive Strength: 3000 psi at 28 days.
3. Maximum w/cm: 0.53.
4. Minimum Cementitious Materials Content: 470 lb/cu. yd.
5. Maximum Size Aggregate: 1/2 inch.
6. Slump Limit: 3 inches, plus 1 inch or minus 2 inches.
7. Air Content: 4.5 - 7.5 percent, plus or minus 0.5 percent at point of delivery.
8. Limit water-soluble, chloride-ion content in hardened concrete to 0.05 percent by weight of cement.
9. Retarding Admixture: Not allowed.
10. Accelerating Admixture: Not allowed.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish batch ticket information.

PART 3 - EXECUTION

3.1 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.
 - 3. Lap vapor retarder over footings and grade beams not less than **6 inches**, sealing vapor retarder to concrete.
 - 4. Lap joints **6 inches** and seal with manufacturer's recommended tape.
 - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 - 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by **6 inches** on all sides, and sealing to vapor retarder.

3.3 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least **1-1/2 inches** into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings. Unless, otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of **1/8 inch**. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch-** wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than **1/2 inch** or more than **1 inch** below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:
1. Install dowel bars and support assemblies at joints where indicated on Drawings.
 2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of **ACI 301**, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 - 1. If a section cannot be placed continuously, provide construction joints as indicated.
 - 2. Deposit concrete to avoid segregation.
 - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with **ACI 301**.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least **6 inches** into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.5 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. **ACI 301** Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than **1-1/2 inches** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1 inch**.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: **ACI 117** Class D.
 - e. Apply to concrete surfaces not exposed to public view.
2. **ACI 301** Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1/4 inch**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117** Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
3. **ACI 301** Surface Finish SF-3.0:
 - a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1/8 inch**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117** Class A.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraighten, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish:
 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 7. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch 1/8 inch and also no more than 1/16 inch in 2 feet.
- C. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
 1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.

3.7 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.

3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases **6 inches** or as required for equipment high unless otherwise indicated on Drawings and extend base not less than **6 inches** in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 3. Minimum Compressive Strength: **3000 psi** at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on **18-inch** centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in inserts and accessories, as shown on Drawings.
 2. Screed, tamp, and trowel finish concrete surfaces.

3.8 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with **ACI 301** and ACI 306.1 for cold weather protection during curing.
 2. Comply with **ACI 301** and **ACI 305.1** for hot-weather protection during curing.
 3. Maintain moisture loss no more than **0.2 lb/sq. ft. x h**, calculated in accordance with ACI 305.1, before and during finishing operations.
- B. Curing Formed Surfaces: Comply with **ACI 308.1** as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.

3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - d. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with **ACI 308.1** as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - c. Floors to Receive Polished Finish: Contractor has option of the following:

- 1) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- d. Floors to Receive Chemical Stain:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
- e. Floors to Receive Urethane Flooring:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover and cover immediately with polyethylene moisture-retaining cover with edges lapped **6 inches** and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- f. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- g. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.9 TOLERANCES

- A. Conform to **ACI 117**.

3.10 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than (per manufacturer requirements) days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 4. Rinse with water; remove excess material until surface is dry.
 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.

- B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- C. Inspections:
1. Headed bolts and studs.
 2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; ASTM C173/C173M volumetric method, for structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 7. Compression Test Specimens: ASTM C31/C31M:

- a. Cast and laboratory cure two sets of four 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of four standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
- a. Test one set of four laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of four field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three (3) consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Nondestructive Testing: Impact hammer, so no scope or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:
- a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within hours of completion of floor finishing and promptly report test results to Architect.

3.12 PROTECTION

- A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION

SECTION 03 35 10

POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies Dyed and polished concrete.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-in-Place Concrete.
 - 2. Section 07 92 00 Joint Fillers.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 302.1R Guide for Concrete Floor and Slab Construction.
- B. ASTM International:
 - 1. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 2. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.
 - 3. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- C. Reunion Internationale des Laboratoires D'Essais et de Recherches sur les Materiaux et les Constructions (RILEM):
 - 1. Rilem Test Method 11.4 Standard Measurement of Reduction of Moisture Penetration Through Horizontal Concrete Surfaces.
- D. National Floor Safety Institute (NFSI):
 - 1. NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.
 - 2. ANSI Standards B-101.1 – 2009 Manufacturer required to have a letter certifying compliance

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring that has been selected, manufactured and installed to achieve the following:
 - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
 - 2. Reflectivity: Increase of 35% as determined by standard gloss meter.
 - 3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
 - 4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.

- B. Design Requirements:
 - 1. Hardened Concrete Properties:
 - a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
 - b. Normal Weight Concrete: No lightweight aggregate.
 - c. Non-air entrained.
 - d. Maximum W/Cm ratio of .50.
 - 2. Placement Properties:
 - a. Natural concrete slump of 4 inches - 5 inches (100 - 127 mm). Admixtures may be used.
 - b. Flatness Requirements:
 - 1) Overall FF 50.
 - 2) Local FF 40.
 - 3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.
 - 4. Curing Options:
 - a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure).
 - 1) Acrylic curing and sealing compounds NOT recommended.
 - b. Sheet membrane (ASTM C171); polyethylene film not recommended.
 - c. Damp Curing: Seven day cure.

1.04 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.
- B. Shop Drawings: Indicate information on shop drawings as follows:
 - 1. Typical layout including dimensions and floor grinding schedule.
 - 2. Plan view of floor and joint pattern layout.
 - 3. Areas to receive colored surface treatment.
 - 4. Hardener, sealer, densifier in notes.
- C. Product Data: Submit product data, including manufacturer's SPEC-DATA® product sheet, for specified products.
 - 1. Material Safety Data Sheets (MSDS).
 - 2. Preparation and concrete grinding procedures.
 - 3. Colored Concrete Surface, Dye Selection Guides.

1.05 INFORMATION SUBMITTALS

- A. Quality Assurance:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in 1.03 Performance Requirements.
 - 2. Certificates:
 - a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
 - c. Current contractor's certificate signed by manufacturer declaring contractor as an approved installer of polishing system.
3. Manufacturer's Instructions: Manufacturer's installation instructions.

1.06 CLOSEOUT SUBMITTALS

- A. Warranty: Submit warranty documents specified.
- B. Operation and Maintenance Data: Submit operation and maintenance data for installed products in accordance with Section 01 77 00 - Closeout Submittals.
1. Include:
 - a. Manufacturer's instructions on maintenance renewal of applied treatments.
 - b. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.07 QUALITY ASSURANCE

- A. Qualifications:
1. Installer with a minimum of 5 years of experience in performing work of this section who has specialized in installation of work similar to that required for this project.
 2. Installer trained and holding a current certificate as a FGS PermaShine installer.
 3. Current Certification from the CPAA stating that the technicians are trained craftsmen. (delete)
 4. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.
- B. Regulatory Requirements.
1. NFSI Test Method 101-A Phase Two Level High Traction Material.
- C. Mock-Ups:
1. Construct field mock-ups in accordance with Section 01 45 00 - Quality Control.
 2. Mock-Up Size: 100 ft² sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
 3. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
 4. Allow ample time to allow for finishing and curing and for inspection of mock-up before proceeding with work.
 5. When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may Not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Architect.

6. Mock-up will show specified level of aggregate exposure as:
 - **Class B – Fine Aggregate (Salt/Pepper) Finish** - Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
7. Mock up to show specified level of gloss level when concrete is mechanically processed as outlined in section 3.03 Installation.
 - **Level 3 Sheen Semi-Polished (Medium High Reflective)** as determined by a gloss reading of 25 – 70 (400 – 800 grit)

Note: Gloss readings are not to be obtained through the use of any topical protective coating enhancers or the result of resin transfer from resin bond abrasives. Take readings before application of these products.

- D. Preinstallation Meetings: Conduct a preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 31 19 - Project Meetings. Review the following:
 1. Environmental requirements.
 2. Scheduling and phasing of work.
 3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
 4. Protection of adjacent surfaces.
 5. Surface preparation.
 6. Repair of defects and defective work prior to installation.
 7. Cleaning.
 8. Installation of polished floor finishes.
 9. Application of liquid hardener, densifier.
 10. Protection of finished surfaces after installation.
 11. Do not place any materials on the concrete surface that may cause staining, etching or scratching

1.08 DELIVERY, STORAGE & HANDLING

- A. General: Comply with 01 60 00 - Common Product Requirements.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery:
 1. Deliver materials in manufacturer's original packaging with identification labels and seals intact.
- D. Storage and Protection:
 1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

2. Protect concrete slab.
 - a. Protect from petroleum stains during construction.
 - b. Diaper hydraulic power equipment.
 - c. Restrict vehicular parking.
 - d. Restrict use of pipe cutting machinery.
 - e. Restrict placement of reinforcing steel and storage of other ferrous metals on concrete surfaces.
 - f. Restrict use of acids or acidic detergents on concrete surfaces.
 - g. Restrict painting activities over concrete surfaces.

1.09 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

1.10 SEQUENCING

- A. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

1.11 WARRANTY

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

1.12 MAINTENANCE

- A. Comply with manufacturer's written instructions to maintain installed product.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Ensure manufacturer has minimum 5 years of experience in manufacturing components similar to or exceeding requirements of project.
- B. Furnish products of one of the following Manufacturer's:
 1. Laticrete International, Inc. (L&M Construction Chemicals, Inc.)
 2. Equivalent Manufacturers as approved by the Architect, in compliance with these specifications.
- C. Basis of Design: Products as manufactured by L&M Construction Chemicals, Inc.

2.02 Polished Concrete Finishing Products

- A. Manufacturer: Laticrete International, Inc.

1. Contact: 1 LATICRETE Park North, Bethany, CT 06524; Telephone: (800) 362-3331, 203-393-0010; Fax: (402) 453-0244; website: www.LMCC.com, www.fgs-permashine.com; E-mail:).
- B. Proprietary Products/Systems:
1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
 - a. Acceptable Material: Laticrete International, Inc., FGS Hardener Plus. Basis of design.
 - b. Acceptable Material: Laticrete International, Inc., Lion Hard may be substituted when conditions exist where disposing of rinse water is in conflict with local building codes.
 2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint filler with Shore A 80 or higher hardness.
 - a. Acceptable Material: Laticrete International, Inc., Joint Tite 750.
 - b. Acceptable Material: Laticrete International, Inc., L&M Restore (for crack repair)
 3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
 - a. Acceptable Material: Laticrete International, Inc., Petrotex.
 4. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with water or VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Acceptable Material: Laticrete International, Inc., Vivid Concrete Dyes or Vivid Dye WB Plus.
 - b. Color as selected by Architect from Manufacturer's standard colors, or as indicated on Drawings.
 5. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).
 - a. Acceptable Material: Laticrete International, Inc., FGS Concrete Conditioner.
 6. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.
 - a. Acceptable Material: Laticrete International, Inc., Permaguard SPS

2.03 SOURCE QUALITY CONTROL

- A. Ensure concrete finishing components and materials are from single manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.
- B. Verify Concrete Slab Performance Requirements:
 - 1. Verify concrete is cured to 28 day 3500 psi strength.
 - 2. Verify concrete surfaces received a hard steel-trowel finish (3 passes) during placement.
 - 3. Verify overall floor flatness is within tolerances specified in Section 03 30 00 (minimum of Ff 40).

3.03 PREPARATION

- A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- B. Examine surface to determine soundness of concrete for polishing.
- C. General Contractor to remove surface contamination.

3.04 INSTALLATION

- A. Floor Surface Polishing and Treatment:
 - 1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
 - 2. Apply floor finish prior to installation of fixtures and accessories.
 - 3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
 - a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
 - b. Expose aggregate in concrete surface only as determined by approved mock-up.
 - c. All concrete surfaces shall be as uniform in appearance as possible.

4. Dyed and Polished Concrete:
 - a. Locate demarcation line between dyed surfaces and other finishes.
 - b. Polish concrete to the 400 grit level, (200 grit for water based dyes).
 - c. Apply pre-mixed dyes to polished concrete surface.
 - d. Allow dye to dry.
 - e. Remove residue with water and buffer pad; reapply as necessary for desired result.
5. Apply FGS Hardener Plus, Hardener, Densifier (or Lion Hard) as follows:
Note: It is required that two coats be applied
 - a. First coat of FGS Hardener Plus at 250 ft²/gal (6.25 m²/L), following the 400 grit level. (Lion Hard @ 400-600 sq ft / gallon)
 - b. Second coat of FGS Hardener Plus at 350 ft²/gal (8.75 m²/L), prior to the final polishing pass (Lion Hard @ 600-800 sq ft / gallon)
 - c. Follow manufacturer's recommendations for drying time between successive coats.
6. Remove defects and re-polish defective areas.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
8. Apply Stain Guard Sealer of gloss selected by Architect in accordance with manufacturer's instructions.

3.05 ADJUSTMENTS

- A. Re-polish those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface prior to the start of polishing operations

3.06 FINAL CLEANING

- A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave work in clean condition.

3.07 PROTECTION

- A. Protect installed product from damage during construction in accordance with Section 03 30 00.
- B. Protect with EZ Cover™ by McTech Corp., Ram Board, or comparable product.

END OF SECTION

SECTION 04 01 20.52

UNIT MASONRY CLEANING

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

- A. Performance Requirements: The application of chemical cleaner shall leave the finished surfaces uniform in color and shall not alter the natural texture of the masonry units.

1.02 SUBMITTALS

- A. Submit samples and manufacturer's instructions for masonry cleaning chemicals for approval prior to delivering materials to the site or commencing the work in this Section.
 - 1. Cleaning compound manufacturer shall procure and apply cleaning solutions to samples of the masonry units to be used in the structure which will be reviewed by the Architect for both aesthetics and effectiveness.
 - 2. Cleaning compound manufacturer's instructions: Submit current method of application for cleaning chemicals stating the actual application rates.

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
 - 2. Applicator: Trained, approved and accepted by the cleaning compound manufacturer. Application personnel shall have at least 2 years experience with the particular materials being applied.
- B. Field Samples:
 - 1. A test area of wall surface from 10 to 20 square feet in size shall be cleaned with the chemical cleaner recommended by the cleaning compound manufacturer for acceptance by the Architect.
 - 2. Test samples of adjacent non-masonry materials for possible reaction with the diluted cleaning materials. Samples to be available for review by the Architect.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Delivery shall be made to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.
- B. Storage and Protection:
 - 1. Store materials in original, unopened containers in compliance with manufacturer's printed instructions.

2. Do not store in areas where temperature will fall below 20 degrees F. or rise above 100 degrees F..

1.05 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Temperature and relative humidity conditions for a period before, during and after application shall be as recommended by the manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Chemical Cleaner:
 1. Cleaner shall be a solution of blended liquid acids, heavily inhibited and emulsified and in combination with special wetting systems.
 2. Specific product selection shall be dependent upon substrate as recommended by the chemical cleaner manufacturer.
 3. Cleaner shall be acceptable to the masonry unit manufacturer.
 4. Muriatic acid shall not be acceptable as a chemical cleaner for new masonry.
 5. Subject to compliance with specification requirements, Sure-Klean Vana Trol, Sure-Klean No. 600 Detergent and Sure-Klean 101 Lime Solvent as manufactured by ProSoCo, Inc., www.prosoco.com or 202V Vana-Stop , 202 New Masonry Detergent and 200 Lime Solve as manufactured by Diedrich Technologies www.diedrichtechnologies.com are acceptable products.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 1. Prior to start of work, carefully inspect the installed work of other trades, and verify that such work is complete to the point where this work may commence.
 2. The chemical cleaner manufacturer's representative shall verify that the chemical cleaner may be applied in accordance with the manufacturer's recommended methods.
 3. In the event of discrepancy, immediately notify the Architect.
 4. Commencement of system application constitutes acceptance of surfaces by applicator.

3.02 PREPARATION

- A. Protection:
 1. Use all means necessary to protect the installed work of other trades.
 2. Concrete sidewalks shall be protected from runoff by soaking with water immediately prior to application on adjacent walls.
 3. Adjoining glass, metal and painted surfaces shall be protected from overspray and splash of chemical cleaner. Inadvertent splashes shall be removed in an approved manner before the solution has damaged the surface.
 4. In the event of damage, immediately make all repairs and replacements necessary to the approval of Architect and at no additional cost to Owner.

B. Surface Preparation for Chemical Cleaner:

1. In strict accordance with manufacturer's printed instructions.
 - a. Masonry walls shall be cleaned within 14 to 28 days after installation.
 - b. Walls shall be free of excess mortar.
 - c. Cracks, other than hairline cracks, shall be pointed up.
 - d. Defective mortar joints shall be routed out, pointed with mortar and tooled.
2. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

C. Presoaking Hoses:

1. Adequate water supply shall be made available to assure thorough pre-soaking and thorough rinsing of the wall before undertaking general cleaning.
2. Two water hoses shall be used by the cleaning crew.
3. One hose shall be attached to a length of lawn soaker hose placed along the top of the wall to provide a uniform and complete saturation of the entire wall area.
4. The second hose shall provide a copious flow of water for thorough flushing of excess mortar and dirt from the scrubbed areas.
5. The lawn soaker hose is later to be placed at the face of the scaffold or stage to provide a continuous spray of wall areas below the working area.

3.03 APPLICATION

A. Chemical Cleaner: Application to be in strict accordance with manufacturer's printed instructions and as follows:

1. Surfaces shall be thoroughly pre-soaked with clean water to prevent the absorption of the cleaning solution within the pores of the masonry.
2. Cleaning solution shall be diluted with clear water and applied to pre-soaked wall areas with a long handled stiff fibered masonry wall washing brush, or other brush as recommended by the cleaning compound manufacturer. The cleaning solution may also be applied with a garden-type low pressure sprayer having a maximum nozzle pressure of 50 psi (3.5kg/cm²). Allow the solution to remain on the wall 5 to 10 minutes, or as recommended by the cleaning solution manufacturer. Wooden paddles or other non-metallic tools may be used to remove stubborn particles. Cleaning shall be restricted to small areas of up to 20 square feet at a time.
3. After washing a given area, the wall shall be flushed with a copious amount of clear water, working from top to bottom, before the solution dries on the wall surface. All of the cleaning solution shall be completely rinsed off of the wall.
4. Rinsing water may be applied with a high-pressure hose system with a maximum nozzle pressure of 700 psi . The high-pressure nozzle tips shall have a fan spray angle of from 15 to 45 degrees. The high-pressure system shall have a water flow rate of 3 to 8 gallons per minute. Care shall be taken to avoid damaging the brick unit or the mortar joints with the high-pressure water spray.

5. Repeat the procedure on spots which require additional cleaning.
6. Clean roof side and top of parapet walls.

END OF SECTION

SECTION 04 05 15

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SUBMITTALS

A. Mix Designs:

1. Submit mix designs and samples to the Architect for review prior to delivering materials to the site or commencing the Work.
 - a. Mortar Mix Design: Furnish in accordance with ASTM C270.
 - b. Grout Mix Design: Furnished by either the grout supplier or an independent testing laboratory. Submit comprehensive strength data with mix design submittals when pozzolans are used.
2. Submit written colored mortar proportions for each color of mortar to be supplied for review by the Architect.

B. Samples: Submit mortar channels for color selection.

C. Product Data: If alternative mortar materials are to be provided, submit current instructions stating the actual quantities and mixing instructions for alternative mortar materials to conform to specified requirements.

1. Submit test report data substantiating compliance with specified performance requirements.
2. Submit current ICC Evaluation Report.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection: Cementitious materials shall be stored off the ground, under cover and shall be kept dry.

B. Preblended Mortar Mix Delivery System: The use of dry preblended mortar silos and bulk bags shall be acceptable. Bulk bags and silos shall be sealed to prohibit contamination of the ingredients and to keep the materials dry until mixed.

1.03 PROJECT/SITE CONDITIONS

A. Environmental Requirements:

1. Hot Weather Requirements: Wet mortar board before loading and cover mortar to retard drying when not being used.
2. Cold Weather Requirements: In accordance with "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" by IMIAC; provide adequate equipment for heating the mortar and grout materials, when air temperature is below 40 degrees F.. Temperatures of the separate materials, including water, shall not exceed 140 degrees F. when placed in the mixer. When air temperature is below 32 degrees F., maintain mortar temperature on boards above freezing.

PART 2 PRODUCTS**2.01 MATERIALS****A. Mortar:**

1. Cement: Type II Portland cement conforming to ASTM C150.
2. Aggregate: Clean, sharp and well graded and free from injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter, conforming to ASTM C144, except that no less than 3 percent nor more than 10 percent shall pass a No. 100 sieve.
3. Hydrated Lime: ASTM C207, Type S or N.
4. Water: Clean and potable.
5. Admixtures:
 - a. Chemical: The use of accelerator admixtures, water reducing plasticizers and other chemical admixtures shall not be allowed.
 - b. Mineral: In accordance with Section 03 05 05.
 - c. Water-Repellent Admixture: In accordance with Section 04 05 26.
 - d. Alternative Plasticizer: Pozzolanic formulation consisting of a combination of hydroxy aluminum silicates and diatomite:
 - 1) Alternative Plasticizer Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
 - 2) Mortar mix design shall be in accordance with ICC Evaluation Report, in accordance with the mortar type specified elsewhere in this specification.
 - 3) Provide alternative plasticizer in accordance with manufacturer's printed instructions, including specific mixing instruction.
 - 4) No other admixtures shall be used in conjunction with the alternative plasticizer unless approved in writing by the alternative plasticizer manufacturer.
 - 5) Packing and Shipping: Mortar admixture(s) shall be delivered to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.

B. Grout:

1. Cement: Type II Portland cement conforming to ASTM C150.
2. Aggregate: ASTM C404 and as follows:
 - a. Sand: Size No. 1 for fine aggregate.
 - b. Pea Gravel: Size No. 8 for coarse aggregate.
3. Water: Clean and potable.

2.02 MIXES**A. Mortar: ASTM C 270, Type S or N.**

1. Measurement: Accurately measure materials by ASTM C270 by [the Property Method per Table 2](#).
2. Mix cementitious materials and aggregates 3 to 5 minutes in a mechanical mixer. Small amounts of mortar may be mixed by hand. Adjust consistency of the mortar depending on the absorptive quality of the units being laid, and to the satisfaction of the mason.
3. If mortar begins to stiffen, it may be retempered by adding water within a basin formed by the mortar, and remixing.
4. Use within 2-1/2 hours of initial mixing and no mortar shall be used after it has begun to set or after it has become harsh or non-plastic.
5. Water-Repellent Admixture: In accordance with Section 04 05 26.
6. Preblended Mortar Mix: Provide mortar as specified herein, except that dry ingredients may be preblended and bulk packaged for delivery to a jobsite silo

(which loads into batch mixer) or bagged for hand loading into mixer. Moisture shall be extracted from sands. Digital printouts displaying the proportions of each batch shall be submitted to the Architect upon request. Mixing shall be accomplished by mechanical mixer in accordance with instructions provided by Preblended Mortar Mix Distributor.

- B. Grout:
 - 1. Job-Site Mixed: In accordance with ASTM C476.
 - 2. Transit-Mixed:
 - a. Designed by the supplier or an independent testing laboratory with a minimum compressive strength of 2000 psi (140mPa) in 28 days, unless higher strength is required by the Structural Drawings and Notes.
 - b. Slump: Not to exceed 8 inches, unless otherwise noted on Drawings.
 - c. Use within 1-1/2 hours of initial mixing and use no grout after it has begun to set or after it has become harsh or non-plastic.
 - d. Course grout may be used in cavity walls with a horizontal dimension of 2 inches or more, and in hollow cell construction 4 inches or more in both horizontal directions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation of mortar and grout shall be as specified under each of the following Sections and in accordance with AMG Standard 108:
 - 1. Section 04 22 00 – Concrete Unit Masonry
- B. Temperature: Mortar and grout shall have a temperature between 50 degrees F. and 90 degrees F. while being used.
- C. Grout may be poured by hand bucket, concrete hopper or through a grout pump. Grout spaces shall not be wet down prior to pouring grout.

3.02 FIELD QUALITY CONTROL

- A. General: Tests and inspections as necessary to verify quality and strength of mortar and grout. Laboratory tests shall conform to applicable ASTM standards and tests.
- B. Tests:
 - 1. Frequency: As determined by the Architect based upon total time for construction of masonry with not less than two tests per each level of masonry construction, foundation to roof or floors.
 - 2. Testing Laboratory: Inspection and testing of mortar and grout will be performed by a testing laboratory in accordance with Section 01 45 00. The testing laboratory, in addition to meeting requirements of ASTM E329, must be an approved laboratory competent to perform cement physical testing.
 - 3. Distribution of Results of Tests: Within 24 hours of results of tests, copies of the results shall be submitted to the Architect, Contractor, masonry contractor, and the grout supplier if applicable.
- C. Mortar:
 - 1. Property Specification (ASTM C270): Testing in accordance with ASTM C 780.
 - 2. For determining hardened mortar properties, prepare 3 test specimens for each test age and property. A strength test shall be the average of the strengths of the specimens tested at the age specified. Specimens shall be tested at 7 and 28 days.

- D. Grout:
1. Testing per ASTM C1019.
 2. Three test specimens shall constitute one sample. A strength test shall be the average of the strengths of the specimen tested at the age specified.
 3. Specimens shall be tested at 7 and 28 days.
 4. The compression strength will be considered satisfactory if the average of three consecutive tests of the grout is equal to or greater than the specified strength and no individual strength test falls below the specified strength by more than 500 psi.

3.03 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 04 05 23
MASONRY ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Furnishing the following items for installation under Section 04 22 00:
1. Ties.
 2. Anchors.
 3. Control joints.
 4. Through wall flashings.
 5. Weep holes.

1.02 SUBMITTALS

- A. Product Data: Submit Manufacturer's brochures depicting each of the masonry accessories which will be used prior to delivering materials to the site or commencing the Work in this Section.

1.03 QUALITY ASSURANCE

- A. Comply with Arizona Masonry Guild Standard 108-95 - Standard Practices

1.04 DELIVERY, STORAGE AND HANDLING

- A. Storage and Protection: Store metal items at the site off the ground and in a manner to prevent damage to the materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following Manufacturers, subject to compliance with Specification requirements.
1. Dur-O-Wall Inc. www.dur-o-wal.com
 2. Heckmann Building Products, Inc. www.heckmannbuildingprods.com
 3. Hohmann and Barnard, Inc. www.h-b.com

2.02 MATERIALS

- A. Steel Wire: ASTM A82, diameter as specified for accessory.
- B. Flat and Corrugated Sheet Steel: ASTM A653 or ASTM A568.
- C. Bar Anchor Material: ASTM A36.
- D. Galvanized Finish: ASTM A641, Class 1, mill galvanized for interior walls, or ASTM A153, Class B-2, hot dip galvanized for exterior walls.
- E. Reinforcing Steel: As specified in Section 03 20 00.

2.03 ACCESSORIES

- A. General: Anchors and ties shall be steel with zinc coated finish or shall be of other non-corrosive metal.
- B. Ties:
1. Adjustable Wall Ties (Facing over CMU):
 - a. 3/16 inch diameter steel wire of approved shape, machine fabricated.
 - b. Provide 2 piece "rectangular" strut compression and tension, eye and pin tie as required by Code.
 2. Veneer Anchors (Facing over Framing):
 - a. 3/16 inch diameter steel wire of approved shape, machine fabricated, designed to be screw fastened.
 - b. Provide 2 piece "Rectangular" or "Triangular" strut, compression and tension, eye and pin tie.
 - c. Screws shall have a copolymer corrosion resistant coating or be Type 304 stainless steel, suitable for attachment of veneer anchors, length as required.
 3. Sheet Metal Ties: 22 gauge corrosion resistant corrugated sheet metal, not less than 7/8 inch wide by 7 inches long, pre-punched for wire ties to horizontal steel.
 4. Metal Lath Ties: 3.4 lb. (1.5kg) copper-bearing expanded plaster lath.
- C. Joint Reinforcing: Ladder type, galvanized steel rods of width 2 inches less than wall thickness conforming to ASTM A951, corrosion protective finish with longitudinal wires not less than 0.148 inch (3.75mm) or more than one half the mortar joint thickness and cross wires not less than 0.148 inch (3.75mm) nor more than the diameter of the longitudinal wires with cross wires projecting nor more than 1/8 inch (3.2mm) beyond the outside longitudinal wires.
- D. Anchors:
1. Dovetail Anchor: 16 gauge flat sheet steel, one inch wide, 5-1/2 inch length, designed for use with embedded slot or inserts.
 2. Bar Anchors: Machine made corrosion protected metal with cross section area not less than .25 square inch with ends turned up 2 inches, not less than 16 inches long for 8 inch walls nor less than 24 inches long for 12 inch walls.
- E. Control Joints:
1. Rubber: Extruded, solid section, ASTM D2000 2AA-805 with a durometer hardness of 70 or 80 when tested per ASTM D2240.
 2. Polyvinyl Chloride (PVC): ASTM D2287, Type PVC 654-4 with a durometer hardness of 85 (+5) when tested per ASTM D2240, minimum tensile strength of 1750 psi with minimum 300 percent elongation per ASTM D638, and cold crack brittleness of 50 degrees F per ASTM D746.
 3. Sizes and Profiles: As required per manufacturer requirements.
- F. Joint Filler: Closed cell neoprene rubber conforming to ASTM D1056, Grade 2A1, oversized 50 percent, self-expanding, 2-3/4 or 3" width by maximum length.
- G. Through-Wall Flashing:
1. Granular surfaced Self-adhering, flexible flashing consisting of pliable and highly adhesive rubberized asphalt compound overall 60 mil thickness; protected from contamination from dust or dirt by a silicone-coated release sheet, to be removed immediately before installation.
 2. Vycor Basik as manufactured by W.R. Grace & Co. - Conn., Cambridge, MA. (800) 558-7066.

3. Provide wall flashing accessories (surface conditioner, termination mastic) as required to provide a complete installation.
- H. Weep Holes: Round plastic tubing, 3/8 inch diameter.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Installation of masonry accessories shall be as specified under each of the following Sections and in accordance with AMG Standard 108.
1. Section 04 22 00 – Concrete Masonry Units
- B. Control Joints: Provide control joints as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.
- B. Through Wall Flashing:
1. Provide through-wall flashings as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.
 2. Specified flashing and accessories are not designed for use as a finished surface or for use in areas where they will be exposed to sunlight. Prevent contact with products containing fresh coal tar or coal tar pitch. Prevent contact with sealant products containing polysulfide polymers due to incompatibility.
 3. Remove deleterious materials from surfaces to be flashed.
 4. Apply surface conditioner by spray, brush or roller at the rate recommended by manufacturer to dirty or dusty surfaces or surfaces having an irregular or rough texture before installing flashing membrane.
 5. Remove silicone-coated release paper and position flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller or blunt object, such as the backside of a utility knife. Fully adhere flashing to substrate to prevent water from migrating under flashing.
 6. Overlap adjacent pieces 2 inches and roll overlaps with a steel hand roller or a blunt object. Fully seal overlaps to prevent water leakage through laps. Trim bottom edge 1/2 inch back from exposed face of the building.
 7. At heads and sill where flashing is indicated to be placed, turn up ends a minimum of 2 inches and make careful folds to form a pan, with the pan seams sealed with compatible mastic acceptable to flashing manufacturer.
 8. Apply a bead or trowel coat of compatible mastic acceptable to flashing manufacturer along top edge, seams, cuts and penetrations. Seal penetrations through flashing with compatible mastic acceptable to flashing manufacturer.
- D. Weep Holes: Provide weep holes at 32 inches o.c., max. and in accordance with the requirements of Specification Section for the masonry units.
- E. Masonry Veneer Ties:
1. Free of material that may destroy bond.
 2. Install as detailed by screwing through sheathing into framing. Begin approximately 8 inches from base of masonry and with maximum spacing of 16 inches vertically and at each vertical stud horizontally. Install final row of ties within 8 inches of top course of masonry.

3.02 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Concrete masonry units.
 2. Decorative concrete masonry units.
 3. Pre-faced concrete masonry units.
 4. Steel reinforcing bars.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples: For each type and color of the following:
1. Exposed and Decorative CMUs.
 2. Pre-faced CMUs.
 3. Pigmented and colored-aggregate mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.
 - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately **60 inches** long by **48 inches** high by full thickness.

1.6 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units and where indicated.
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. ACM Chemistries.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. GCP Applied Technologies Inc.
 - d. Master Builders Solutions.
 - e. Moxie International.
- C. CMUs: ASTM C90.
1. Density Classification: Medium weight or Normal weight unless otherwise indicated.
- D. Decorative CMUs: ASTM C90.
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. York Building Products.
 2. .
 3. Density Classification: Medium weight Normal weight.
 4. Pattern and Texture:
 - a. Standard pattern, ground-face finish. Match Architect's samples.
 - b. Standard pattern, split-face finish. Match Architect's samples.
 - c. Scored vertically, standard finish. Match Architect's samples.
- E. Pre-faced CMUs: Lightweight hollow concrete units complying with ASTM C90, with manufacturer's standard smooth resinous facing complying with ASTM C744.
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. Echelon Corporation.
 - b. York Building Products.
 2. Size: Manufactured with pre-faced surfaces having **1/16-inch-** wide returns of facing to create **1/4-inch-** wide mortar joints.
 3. Colors and Patterns: Match Architect's samples or as selected by Architect from manufacturer's full range.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.

- C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
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. Davis Colors.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Lanxess Corporation.
 - d. Solomon Colors Inc.
- D. Colored Cement Products: Packaged blend made from Portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Colored Portland Cement-Lime Mix:
 - a. **Manufacturers:** Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Holcim (US) Inc.
 - 2) Lafarge North America Inc.
 - 3) Lehigh Hanson; Heidelberg Cement Group.
 2. Colored Masonry Cement:
 - a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cemex S.A.B. de C.V.
 - 2) Essroc.
 - 3) Holcim (US) Inc.
 - 4) Lafarge North America Inc.
 - 5) Lehigh Hanson; Heidelberg Cement Group.
- E. Aggregate for Mortar: ASTM C144.
1. White-Mortar Aggregates: Natural white sand or crushed white stone.
 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
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. Euclid Chemical Company (The); an RPM company.
 - b. GCP Applied Technologies Inc.

- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
 - 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. ACM Chemistries.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. GCP Applied Technologies Inc.
 - d. Master Builders Solutions.
- I. Water: Potable.

2.4 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, **Grade 60**.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from **0.148-inch** steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 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. Heckmann Building Products, Inc.
 - b. Hohmann & Barnard, Inc.
 - c. Wire-Bond.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Mill- galvanized, carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: **0.148-inch** diameter.
 - 4. Wire Size for Cross Rods: **0.148-inch** diameter.
 - 5. Spacing of Cross Rods: Not more than **16 inches** o.c.
 - 6. Provide in lengths of not less than **10 feet**, with prefabricated corner and tee units.

2.5 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

- B. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M .

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
2. Copper: ASTM B370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.
3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
4. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
5. Fabricate metal expansion-joint strips from to shapes indicated.

- B. Flexible Flashing: Use one of the following unless otherwise indicated:

1. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.
 - a. **Manufacturers:** Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) DuPont de Nemours, Inc.
 - 2) GCP Applied Technologies Inc.
 - 3) Protecto Wrap Company.
 - 4) Raven Industries, Inc.
 - 5) Wire-Bond.
2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
 - a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hohmann & Barnard, Inc.
 - 2) Hyload, Inc.
 - 3) Mortar Net Solutions.
 - 4) Wire-Bond.

- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

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. Mortar Net Solutions.

D. Solder and Sealants for Sheet Metal Flashings: As specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.8 MASONRY-CELL FILL

A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use mortar unless otherwise indicated.
3. For exterior masonry, use mortar.
4. For reinforced masonry, use mortar.
5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type S Type N.
 3. For mortar parge coats, use Type S or Type N.
 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments do not exceed 10 percent of Portland cement by weight.
 2. Pigments do not exceed 5 percent of masonry cement by weight.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
- F. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than **2000 psi**.
 3. Provide grout with a slump of **8 to 11 inches** as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus **1/2 inch** or minus **1/4 inch**.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus **1/2 inch**.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus **1/4 inch** in a story height or **1/2 inch** total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than **1/4 inch in 10 feet**, or **1/2-inch** maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 feet**, **1/4 inch in 20 feet**, or **1/2-inch** maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 feet**, **3/8 inch in 20 feet**, or **1/2-inch** maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 feet**, **1/4 inch in 20 feet**, or **1/2-inch** maximum.
5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 feet**, **3/8 inch in 20 feet**, or **1/2-inch** maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**, with a maximum thickness limited to **1/2 inch**.
2. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch** or minus **1/4 inch**.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal **4-inch** horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- F. Fill cores in hollow CMUs with grout **24 inches** under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-CELL FILL

- A. Pour loose-fill insulation lightweight-aggregate fill into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than **20 feet**.
- B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch** on exterior side of walls, **1/2 inch** elsewhere. Lap reinforcement a minimum of **6 inches**.
 - 1. Space reinforcement not more than **16 inches** o.c.
 - 2. Space reinforcement not more than **8 inches** o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than **8 inches** above and below wall openings and extending **12 inches** beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 1. Provide an open space not less than **1 inch** wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than **24 inches** o.c. vertically and **36 inches** o.c. horizontally.

3.8 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At lintels, extend flashing a minimum of **6 inches** into masonry at each end. At heads and sills, extend flashing **6 inches** at ends and turn up not less than **2 inches** to form end dams.
 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch** back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch** back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts

aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.9 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than **60 inches**.

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each **5000 sq. ft.** of wall area or portion thereof.

- E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.
- I. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at seven days and at 28 days.

3.11 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of **3/4 inch**. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of **1/8 inch per foot**. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.12 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within **18 inches** of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 22 00

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Wood furring.
5. Wood sleepers.
6. Utility shelving.
7. Plywood backing panels.

1.2 ACTION SUBMITTALS

1.3 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior

construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all miscellaneous carpentry unless otherwise indicated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet** beyond the centerline of the burners at any time during the test.
 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841. For enclosed roof framing, framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Concealed blocking.
 2. Roof framing and blocking.

3. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.

2.4 DIMENSION LUMBER FRAMING

- A. Other Framing: No. 2 grade of the following species:

1. Douglas fir-larch; WCLIB or WWPA.
2. Douglas fir-south; WWPA.

2.5 MISCELLANEOUS LUMBER

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

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.

- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

- C. Utility Shelving: Lumber with 15 percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.

- D. Concealed Boards: 15 percent maximum moisture content of the following species and grades:

1. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 FASTENERS

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

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

- B. Screws for Fastening to Metal Framing: ASTM C1002, length as recommended by screw manufacturer for material being fastened.

- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than **0.025 inch**.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

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SECTION 07 84 13
PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

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

- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. International Fireproof Technology Inc.
 - e. RectorSeal Firestop; a CSW Industrials Company.
 - f. Specified Technologies, Inc.
 - g. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg.**
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg.**
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of **0.30-inch wg.**
 - 1. L-Rating: Not exceeding **5.0 cfm/sq. ft.** of penetration opening at and no more than **50-cfm** cumulative total for any **100 sq. ft.** at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

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

3.2 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than **3 inches** high and with minimum **0.375-inch** strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at **15 feet** from end of wall and at intervals not exceeding **30 feet**.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches** of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

END OF SECTION 07 84 13

SECTION 079200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-staining silicone joint sealants.
2. Urethane joint sealants.

1.2 PREINSTALLATION MEETINGS

1.3 ACTION SUBMITTALS

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

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction field-adhesion-test reports.

B. Field-adhesion-test reports.

C. Sample warranties.

1.5 QUALITY ASSURANCE

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.7 WARRANTY

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

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

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

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation.
 - b. Sika Corporation; Joint Sealants.
 - c. Tremco Incorporated.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, M, NS, 25, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Use NT.

1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation.
 - b. Sherwin-Williams Company (The).

2.4 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 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. Adfast.
 - b. Alcot Plastics Ltd.
 - c. BASF Corporation.
 - d. Construction Foam Products; a division of Nomaco, Inc.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 1. Remove laitance and form-release agents from concrete.
 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed, and cured sealant joints as follows:
 - a. Perform [10] tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. .
 - 2. Joint Sealant:
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Vertical joints on exposed surfaces of unit masonry concrete walls and partitions.
 - 2. Joint Sealant: Urethane, S, NS, 25, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

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SECTION 07 92 19
ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Samples: Manufacturer's color charts consisting of strips of cured sealants, showing full range of available colors for each product exposed to view.
- C. Acoustical joint-sealant schedule.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

- A. Warranty Documentation:
1. Manufacturers' special warranties.
 2. Installer's special warranties.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

- A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. Hilti, Inc.
 - c. Pecora Corporation.
 - d. Tremco Incorporated.
 - e. USG Corporation.
 - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors .

2.2 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

END OF SECTION 07 92 19

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door; ASSA ABLOY.
 2. Curries Company; ASSA ABLOY.
 3. DCI Hollow Metal.
 4. Fleming Door Products Ltd.; Assa Abloy Group Company.
 5. Mesker Door Inc.
 6. Republic Doors and Frames.
 7. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. **Fire-Rated Door Assemblies:** Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
1. **Smoke- and Draft-Control Door Assemblies:** Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.
 2. **Temperature-Rise Limit:** Where indicated on Drawings, provide doors that have a maximum transmitted temperature end point of not more than **450 deg F** above ambient after 30 minutes of standard fire-test exposure.
- B. **Fire-Rated, Borrowed-Lite Assemblies:** Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.
- C. **Thermally Rated Door Assemblies:** Provide door assemblies with U-factor of not more than 0.83 when tested in accordance with ASTM C518.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. Interior Doors.

1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: **1-3/4 inches**.
 - c. Face: Uncoated steel sheet, minimum thickness of **0.042 inch**.
 - d. Edge Construction: Model 2, Seamless.
 - e. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of **0.053 inch**.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. Exterior Doors.

1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: **1-3/4 inches**.
 - c. Face: Metallic-coated steel sheet, minimum thickness of **0.042 inch**, with minimum **A60** coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Manufacturer's standard.
2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of **0.053 inch**, with minimum **A60** coating.
 - b. Construction: Full profile welded.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness of **0.053 inch**.

B. Construction: Full profile welded.

- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each **24 inches** of frame height above **7 feet**.
 - 3. Postinstalled Expansion Anchor: Minimum **3/8-inch-** diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Material: ASTM A879/A879M, Commercial Steel (CS), **04Z** coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum **3/4 inch** beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches** o.c. and not more than **2 inches** o.c. from each corner.

2.9 STEEL FINISHES

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: plus or minus **1/16 inch**, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
- 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
 - 3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 11 13

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SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.
2. Fire-rated wood door frames.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Door trim for openings.
6. Door frame construction.
7. Factory-machining criteria.
8. Factory- finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Clearances and undercuts.
7. Requirements for veneer matching.
8. Apply Program label to Shop Drawings.

C. Samples: For factory-finished doors.

1.3 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: Program certificates.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated on Drawings, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.
 - 1. Provide labels and certificates from certification program indicating that doors and frames comply with requirements of grades specified.
 - a. Contractor shall register the Work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling 855-345-0991.

2.3 SOLID-CORE, FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Lambton Doors.
 - b. Masonite Architectural.

- c. Oshkosh Door Company.
- d. VT Industries Inc.
2. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
3. ANSI/WDMA I.S. 1A Grade: Custom.
4. Faces: Single-plywood veneer not less than **1/50 inch** thick.
 - a. Species: Red oak.
 - b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Running match.
 - e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - f. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by **10 feet** or more.
 - g. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 - h. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Section 06 42 16 "Flush Wood Paneling."
5. Exposed Vertical and Top Edges: Applied wood-veneer edges of same species as faces and covering edges of faces - Architectural Woodwork Standards edge Type B.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: **550 lbf** in accordance with WDMA T.M. 10.
6. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES AND LOUVERS

- A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of **0.048-inch-** thick, cold-rolled steel sheet; factory primed for paint or with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

B. Metal Louvers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Activar Construction Products Group, Inc.
 - b. Allegion plc.
 - c. Anemostat Products; a Mestek company.
 - d. ASSA ABLOY.
 - e. L & L Louvers, Inc.
 - f. McGill Architectural Products.
2. Blade Type: Vision-proof, inverted V.
3. Metal and Finish: Hot-dip galvanized steel, **0.040 inch** thick, factory primed for paint or with baked-enamel- or powder-coated finish.

C. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Activar Construction Products Group, Inc.
 - b. Allegion plc.
 - c. Anemostat Products; a Mestek company.
 - d. ASSA ABLOY.
 - e. L & L Louvers, Inc.
 - f. McGill Architectural Products.
2. Metal and Finish: Hot-dip galvanized steel, **0.040 inch** thick, factory primed for paint or with baked-enamel- or powder-coated finish.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."
3. Louvers: Factory install louvers in prepared openings.
4. Flash top of out-swinging doors with manufacturer's standard metal flashing.

2.6 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all four edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 1. ANSI/WDMA I.S. 1A Grade: Custom.
 2. Finish: ANSI/WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
 3. Staining: As selected by Architect from manufacturer's full range.
 4. Effect: Filled finish.
 5. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 1. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches**.
 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 3. Install fire-rated doors and frames in accordance with NFPA 80.
 4. Install smoke- and draft-control doors in accordance with NFPA 105.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:
 - a. Provide **1/8 inch** at heads, jambs, and between pairs of doors.
 - b. Provide **1/8 inch** from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide **1/4 inch** from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
5. Bevel non-fire-rated doors **1/8 inch in 2 inches** at lock and hinge edges.
6. Bevel fire-rated doors **1/8 inch in 2 inches** at lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes aluminum windows for exterior locations.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

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

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. Window: **10** years from date of Substantial Completion.
 - b. Glazing Units: **Five** years from date of Substantial Completion.
 - c. Aluminum Finish: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: As indicated on Drawings.
 - 2. Minimum Performance Grade: As indicated on Drawings.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **0.50 Btu/sq. ft. x h x deg F.**
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **0.25.**
- E. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of **45.**
- F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: **120 deg F** ambient; **180 deg F** material surfaces.

2.2 ALUMINUM WINDOWS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. Arcadia, Inc.
 - 2. EFCO Corporation.
 - 3. Kawneer North America, an Arconic company.
 - 4. Oldcastle Building Envelope (OBE); CRH Americas.
- B. Types: As indicated on Drawings.
- C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.
- D. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
1. Kind: Fully tempered as indicated on Drawings.
- E. Insulating-Glass Units: ASTM E2190.
1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: **Gray**.
 - b. Kind: Fully tempered as indicated on Drawings.
 2. Lites:
 3. Filling: Fill space between glass lites with air.
 4. Low-E Coating: Pyrolytic on second surface.
- F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- G. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- 2.3 ACCESSORIES
- A. Subsills: Thermally broken, extruded aluminum subsills in configurations indicated on Drawings.
- B. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- 2.4 FABRICATION
- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weatherstrip each operable sash to provide weathertight installation.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

- F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.5 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class II, **Color Anodic Finish**: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.
 - 1. Color: As selected by Architect from full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 51 13

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SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for steel (hollow metal) doors.
 - 2. Door hardware for aluminum doors.
 - 3. Door hardware for wood doors.
 - 4. Door hardware for other doors indicated.
 - 5. Keyed cylinders as indicated.

- B. Related Sections:
 - 1. Division 6: Rough Carpentry.
 - 2. Division 8: Aluminum Doors and Frames
 - 3. Division 8: Hollow Metal Doors and Frames.
 - 4. Division 8: Wood Doors.
 - 5. Division 26 Electrical
 - 6. Division 28: Electronic Security

- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. ICC – International Building Code

- D. Intent of Hardware Groups
 - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

- E. Allowances
 - 1. Refer to Division 1 for allowance amount and procedures.

- F. Alternates
 - 1. Refer to Division 1 for Alternates and procedures.

1.2 SUBSTITUTIONS:

- A. Comply with Division 1.

1.3 SUBMITTALS:

- A. Comply with Division 1.
- B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit 6 copies of catalog cuts with hardware schedule.
 - 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
 - 1. List groups and suffixes in proper sequence.
 - 2. Completely describe door and list architectural door number.
 - 3. Manufacturer, product name, and catalog number.
 - 4. Function, type, and style.
 - 5. Size and finish of each item.
 - 6. Mounting heights.
 - 7. Explanation of abbreviations and symbols used within schedule.
 - 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
 - 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Architect)
 - 1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 - 2. 3 samples of metal finishes
- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
 - 1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 - 2. Copy of final hardware schedule, edited to reflect, "As installed".

3. Copy of final keying schedule
4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

- B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

- A. Refer to Conditions of the Contract
- B. Manufacturer's Warranty:
 - 1. Closers: Lifetime
 - 2. Exit Devices: Five Years
 - 3. Locksets & Cylinders: Ten years
 - 4. All other Hardware: Two years.

1.8 OWNER'S INSTRUCTION:

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
 - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
 - 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>
Hinges	Stanley
Continuous Hinges	Stanley
Locksets	Best
Cylinders	Best
Exit Devices	Precision
Closers	Stanley
Push/Pull Plates	Trimco
Push/Pull Bars	Trimco
Protection Plates	Trimco
Overhead Stops	ABH
Door Stops	Trimco
Flush Bolts	Trimco
Coordinator & Brackets	Trimco
Threshold & Gasketing	National Guard

2.2 MATERIALS:

A. Hinges: Shall be Five Knuckle Ball bearing hinges

1. Template screw hole locations
2. Bearings are to be fully hardened.
3. Bearing shell is to be consistent shape with barrel.
4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
5. Equip with easily seated, non-rising pins.
6. Non Removable Pin screws shall be slotted stainless steel screws.
7. Hinges shall be full polished, front, back and barrel.
8. Hinge pin is to be fully plated.
9. Bearing assembly is to be installed after plating.
10. Sufficient size to allow 180-degree swing of door
11. Furnish five knuckles with flush ball bearings
12. Provide hinge type as listed in schedule.
13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
15. UL10C listed for Fire rated doors.

B. Geared Continuous Hinges:

1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
2. Anti-spinning through fastener
3. UL10C listed for 3 hour Fire rating
4. Non-handed
5. Lifetime warranty
6. Provide Fire Pins for 3-hour fire ratings
7. Sufficient size to permit door to swing 180 degrees

C. Cylindrical Type Locks and Latchsets:

1. Provide locksets tested and approved by BHMA/ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty.
2. Provide locksets listed by Underwriters Laboratories for use on fire rated single or double swinging doors.
3. Provide locksets that meet the design and operation of the cylindrical lock to meet the accessible requirements of ANSI A117.1 and ADA–Americans with Disabilities Act.
4. Provide locksets that meet Florida Building Code and Miami-Dade County Code:
 - a. 9/16" latch throw – Listed by Florida Building Code and Miami-Dade County at ± 75 PSF for single doors.
 - b. 3/4" latch throw – Listed by Florida Building Code and Miami Dade County at ± 80 PSF for single doors and ± 50 PSF for double doors.
5. Provide locksets that are listed with the California State Fire Marshal.
6. Provide locksets made in a manufacturing facility to compliant with ISO 9001-Quality Management and ISO 14001-Environmental Management.
7. Provide locksets that meet or exceed 50 Million cycle test verified by third party testing agency.
8. Provide locksets with the following mechanical features
 - a. Locksets outside locked lever must withstand minimum 1400 inch-pounds of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
 - b. Locksets shall fit modified ANSI A115.2 door preparation.
 - c. 2-3/4 inch (70 mm) backset, standard.
 - d. Door thickness – Available for 1 3/8" to 2 1/4" doors.
 - e. 9/16 inch (14 mm) throw latchbolt.

- f. Latch to have single piece tail-piece construction.
 - g. Chassis – Critical latch and chassis components to be brass or corrosion-treated steel.
 - h. Lock shall allow the lever handle to move 45 degrees from parallel to the horizontal plane without engaging the latchbolt assembly.
 - i. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
 - j. Locksets to have anti-rotational studs that are thru-bolted.
 - k. Provide sufficient curved strike lip to protect door trim at single doors. At pairs of doors, provide 7/8" Lip to Center Strike.
 - l. Each lever to have independent spring mechanism.
 - m. Lever springs to be contained in the main lock hub.
 - n. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy.
 - o. Keyed lever to be removable only after core is removed, by authorized control key.
 - p. Abrasive lever handles to have a special abrasive strip on back of the hand grasp portion of the lever.
 - q. Tactile lever handles to have grooves machined into the back of the hand grasp portion of the lever.
- 9. Locksets to have the capability of supporting manufacturers' conventional core as well as large and small interchangeable cores.
 - 10. Provide core face with the same finish as the lockset.
 - 11. Provide functions and design as indicated in the hardware groups.
 - 12. Acceptable manufacturers and/or products:
 - a. dormakaba USA Inc. - Best 9K Series
 - b. No Substitutions Allowed-District Standards

D. Exit Devices:

- 1. Exit devices to meet or exceed BHMA for ANSI 156.3, Grade 1.
- 2. Exit devices to be tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.
- 3. Exit devices chassis to be investment cast steel, zinc dichromate.
- 4. Exit devices to have stainless steel deadlocking 3/4" through latch bolt.
- 5. Exit devices to be equipped with sound dampening on touchbar.
- 6. Non-fire rated exit devices to have cylinder dogging.
- 7. Non-fire rated exit devices to have 1/4" minimum turn hex key dogging.
- 8. Touchpad to be "T" style constructed of architectural metal with matching metal end caps.
- 9. Touchbar assembly on wide style exit devices to have a 1/4" clearance to allow for vision frames.
- 10. All exposed exit device components to be of architectural metals and "true" architectural finishes.
- 11. Provide strikes as required by application.
- 12. Fire exit hardware to conform to UL10C and UBC 7-2. UL tested for Accident Hazard.
- 13. The strike is to be black powder coated finish.
- 14. Exit devices to have field reversible handing.
- 15. Provide heavy duty vandal resistant lever trim with heavy duty investment cast stainless steel components and extra strength shock absorbing overload springs. Lever shall not require resetting. Lever design to match locksets and latchsets.
- 16. Provide 9001-Quality Management and 14001-Environmental Management.
- 17. Vertical Latch Assemblies to have gravity operation, no springs.
- 18. Exit Device Intruder Function Visual Indicator is to be used in conjunction with the ANSI "10" Function, which allows the outside lever trim to be locked from the inside while the door remains closed. Rim cylinder on the exterior/trim side retracts the latch from the outside.
 - a. Indicator to be actuated by a rim cylinder equipped with a keyed core or thumb-turn.
 - b. Directional indicator feature shall have a large status indicator window with directional pointer embossed into the active case cover to indicate key turn direction to lock and unlock outside lever trim. Labels or stickers are not acceptable.

- c. The status indicator window shall be integrated into the housing of the exit device and is to contain bright reflective material that may be seen in low light conditions.
 - d. Indicator window to be protected by impact resistant lens cover.
 - e. The action to lock down/unlock shall require a quarter turn (90°) of key or thumb turn.
 - 1) Locked status shall be indicated by a red indicator that will appear under the lens cover with an image of a locked padlock.
 - 2) Unlocked status shall be indicated by a green indicator that will appear under the lens of the cover with an image of an unlocked padlock.
19. Acceptable manufacturers and/or products:
- a. dormakaba USA Inc. – Precision Apex 2000 Series
 - b. No Substitutions Allowed-District Standards

E. Cylinders:

- 1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
- 2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
- 3. Coordinate and provide as required for related sections.
- 4.
- 5. Acceptable manufacturers and/or products:
 - a. dormakaba USA Inc. – Best 1E Series
 - b. No Substitutions Allowed-District Standards

F. Door Closers shall:

- 1. Tested and approved by BHMA for ANSI 156.4, Grade 1
- 2. UL10C certified
- 3. Provide 9001-Quality Management and 14001-Environmental Management.
- 4. Closer shall have extra-duty arms and knuckles
- 5. Conform to ANSI 117.1
- 6. Maximum 2 7/16 inch case projection with non-ferrous cover
- 7. Separate adjusting valves for closing and latching speed, and backcheck
- 8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
- 9. Full rack and pinion type closer with 1½" minimum bore
- 10. Mount closers on non-public side of door, unless otherwise noted in specification
- 11. Closers shall be non-handed, non-sized and multi-sized.
- 12. Acceptable manufacturers and/or products:
 - a. dormakaba USA Inc. – Stanley QDC100 Series
 - b. No Substitutions Allowed-District Standards

G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

- 1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
- 2. Provide fastener suitable for wall construction.
- 3. Coordinate reinforcement of walls where wall stop is specified.
- 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered

H. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.

- 1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
- 2. Surface overhead stops shall be heavy duty bronze or stainless steel.

- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
- K. Push Pull Bars: Provide ANSI J504, .1" Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
- L. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- N. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- O. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
 - 1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 - 2. UL10C Positive Pressure rated seal set when required.
- P. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
 - 1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
 - 2. UL10C Positive Pressure rated seal set when required.
- Q. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½" for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Best CORMAX™ Patented 7-pin.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
 - 1. 1 each Grand Masterkeys
 - 2. 4 each Masterkeys
 - 3. 2 each Change keys each keyed core
 - 4. 15 each Construction masterkeys
 - 5. 1 each Control keys
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
 - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers to ensure proper operation.
 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

Manufacturer List

<u>Code</u>	<u>Name</u>
BE	Best Access Systems
NA	National Guard
PR	Precision
SH	Stanley Commercial Hardware
ST	Stanley
TR	Trimco

Finish List

<u>Code</u>	<u>Description</u>
AL	Aluminum
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
US26D	Chromium Plated, Dull

Option List

<u>Code</u>	<u>Description</u>
CD	Cylinder Dogging
CSK	Counter Sunk Screw Holes
B4E	Beveled 4 Edges

Hardware Sets

SET #1.0

Doors: 114A, 114B

3 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Exit Device	2108 X 4908A CD	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer - Cush Stop	QDC119	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Weatherstrip	160SA Head & Jambs		NA
1 Drip Cap	16A - 4" ODW		NA
1 Door Sweep	200NA		NA
1 Handicap Threshold	513A	AL	NA

SET #2.0

Doors: 102, 104, 108, 111, 119B, 126, 128B, 129A, 129B

3 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Office/Entry Lockset	9K3-7AB15D PATD	626	BE
1 Door Closer - Cush Stop	QDC119	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Weatherstrip	160SA Head & Jambs		NA
1 Drip Cap	16A - 4" ODW		NA
1 Door Sweep	200NA		NA
1 Handicap Threshold	513A	AL	NA

SET #3.0

Doors: 107, 136

3 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Storeroom Lockset	9K3-7D15D PATD	626	BE
1 Door Closer - Rw/PA	QDC111	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Weatherstrip	160SA Head & Jambs		NA
1 Drip Cap	16A - 4" ODW		NA
1 Door Sweep	200NA		NA
1 Handicap Threshold	513A	AL	NA

SET #4.0

Doors: 135

3 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Passage Set	9K3-0N15D	626	BE
1 Door Closer - Rw/PA	QDC111	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Weatherstrip	160SA Head & Jambs		NA
1 Drip Cap	16A - 4" ODW		NA

1 Door Sweep	200NA		NA
1 Handicap Threshold	513A	AL	NA

SET #5.0

Doors: 116

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Passage Set	9K3-0N15D	626	BE
1 Door Closer - Rw/PA	QDC111	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #6.0

Doors: 115, 118, 119A, 120, 124, 127, 128A

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Office/Entry Lockset	9K3-7AB15D PATD	626	BE
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #7.0

Doors: 113, 117

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Pull Plate	1017-3B	630	TR
1 Push Plate	1001-9	630	TR
1 Door Closer - Rw/PA	QDC111	689	SH
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050 B Head & Jambs		NA

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Insulating glass.
3. Glazing sealants.
4. Glazing tapes.
5. Miscellaneous glazing materials.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For glass.
- B. Sample warranties.

1.5 QUALITY ASSURANCE

- A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to

manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- B. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as 0.50 Btu/sq. ft. x h x deg F.
 2. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
 3. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.2 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.3 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
 1. **Manufacturers:** Subject to compliance with requirements, undefined:
 - a. Guardian Glass; SunGuard.
 - b. Pilkington North America.
 - c. Vitro Architectural Glass.
- B. Low-Iron Annealed Float Glass: ASTM C1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent, and SHGC of not less than 0.87.
 1. **Manufacturers:** Subject to compliance with requirements, undefined:
 - a. Guardian Glass; SunGuard.
 - b. Pilkington North America.
 - c. Vitro Architectural Glass.
- C. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.
 1. **Manufacturers:** Subject to compliance with requirements, undefined:
 - a. Guardian Glass; SunGuard.
 - b. Pilkington North America.
 - c. Vitro Architectural Glass.
- D. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

- E. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- F. Reflective- and Low-E-Coated Vision Glass: ASTM C1376.
 - 1. **Manufacturers:** Subject to compliance with requirements, undefined:
 - a. Guardian Glass; SunGuard.
 - b. Pilkington North America.
 - c. Vitro Architectural Glass.
- G. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."
- H. Ceramic-Coated Spandrel Glass: ASTM C1048, Type I, Condition B, Quality-Q3.
- I. Silicone-Coated Spandrel Glass: ASTM C1048, Type I, Condition C, Quality-Q3.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ICD High Performance Coatings.
 - b. Oldcastle Building Envelope (OBE); CRH Americas.
- J. Reflective- and Low-E-Coated Spandrel Glass: ASTM C1376, Kind CS.

2.4 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Eastman Chemical Company.
 - b. Kuraray America, Inc.
 - 2. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 3. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 4. Interlayer Color: Clear unless otherwise indicated.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
 - 1. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary sealants.

2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) Technoform.
 - 2) Thermix; a brand of Ensinger USA.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. **Compatibility:** Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. **Suitability:** Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. **Colors of Exposed Glazing Sealants:** As selected by Architect from manufacturer's full range of industry colors.

B. Neutral-Curing Silicone Glazing Sealant, Class 25: Complying with ASTM C920, Type S, Grade NS, Use NT.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation.
 - b. Sika Corporation.
 - c. The Dow Chemical Company.
 - d. Tremco Incorporated.
2. **Applications:** .

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks:
 - 1. EPDM Silicone with Shore A durometer hardness of 85, plus or minus 5.
 - 2. Type recommended in writing by sealant or glass manufacturer.
- C. Spacers:
 - 1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
 - 2. Type recommended in writing by sealant or glass manufacturer.
- D. Edge Blocks:
 - 1. EPDM Silicone with Shore A durometer hardness per manufacturer's written instructions.
 - 2. Type recommended in writing by sealant or glass manufacturer.
- E. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- F. Provide spacers for glass lites where length plus width is larger than **50 inches**.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.
- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

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

gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

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

3.5 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.6 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type: Fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.
- B. Tinted Glass Type: Fully tempered float glass.
 - 1. Basis-of-Design Product: Match Existing.
 - 2. Tint Color: Match Existing.
 - 3. Minimum Thickness: 6 mm.
 - 4. Safety glazing required.

3.7 INSULATING GLASS SCHEDULE

A. Low-E-Coated, Tinted Insulating Glass Type:

1. Basis-of-Design Product:
2. Overall Unit Thickness: **1 inch**.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Tinted fully tempered float glass.
5. Tint Color: Match Existing.
6. Interspace Content: Air.
7. Indoor Lite: Clear fully tempered float glass.
8. Low-E Coating: Pyrolytic on second surface.
9. Safety glazing required.

END OF SECTION 08 80 00

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SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation reports for embossed, high-strength steel studs and tracks firestop tracks post-installed anchors and power-actuated fasteners.

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for steel unless otherwise indicated.
 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, **G40**, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. ClarkDietrich.
 - c. MarinoWARE.
 - d. MBA Building Supplies.
 - e. MRI Steel Framing, LLC.
 - f. SCAFCO Steel Stud Company.
 2. Minimum Base-Steel Thickness: As indicated on Drawings or as required by performance requirements for horizontal deflection (**min. 25 ga**).
 3. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing **1-1/2-inch** minimum vertical movement.
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.
 - 2) ClarkDietrich.
 - 3) Fire Trak Corp.
 - 4) MarinoWARE.
 - 5) SCAFCO Steel Stud Company.
 - 6) Super Stud Building Products Inc.
 2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.
 - 2) ClarkDietrich.
 - 3) MarinoWARE.
 - 4) MBA Building Supplies.
 - 5) SCAFCO Steel Stud Company.

- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of 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. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. ClarkDietrich.
 - c. Fire Trak Corp.
 - d. MarinoWARE.
 - e. Metal-Lite.
 - f. SCAFCO Steel Stud Company.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. MBA Building Supplies.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO Steel Stud Company.
 2. Minimum Base-Steel Thickness: As indicated on Drawings or min.[**25 ga.**].
- F. Cold-Rolled Channel Bridging: Steel, **0.0538-inch** minimum base-steel thickness, with minimum **1/2-inch-** wide flanges.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. MBA Building Supplies.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO Steel Stud Company.
 2. Depth: As indicated on Drawings or min. **1-1/2 inches.**
 3. Clip Angle: Not less than **1-1/2 by 1-1/2 inches, 0.068-inch-** thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. Jaimes Industries.
 - c. MarinoWARE.
 - d. MBA Building Supplies.
 - e. MRI Steel Framing, LLC.
 - f. SCAFCO Steel Stud Company.

2. Minimum Base-Steel Thickness: As indicated on Drawings or min.**.25 ga.**
 3. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: **1/2-inch-** deep, steel sheet members designed to reduce sound transmission.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. MBA Building Supplies.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO Steel Stud Company.
 2. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: **0.053-inch** uncoated-steel thickness, with minimum **1/2-inch-** wide flanges.
1. Depth: As indicated on Drawings .
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of **0.0329 inch.**
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.062-inch-** diameter wire, or double strand of **0.048-inch-** diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of **1-1/4 inches**, wall attachment flange of **7/8 inch**, minimum uncoated-steel thickness of **0.0179 inch**, and depth required to fit insulation thickness indicated.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. MBA Building Supplies.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO Steel Stud Company.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.062-inch-** diameter wire, or double strand of **0.048-inch-** diameter wire.
- B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58 or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: adhesive anchor.

- c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or **ASTM F 1941**, Class Fe/Zn 5, unless otherwise indicated.
 - d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, **ASTM F 593**, and nuts, **ASTM F 594**.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.16 inch** in diameter.
- D. Flat Hangers: Steel sheet, in size indicated on Drawings or min. **1 by 3/16 inch** by length indicated or required.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of **0.0538 inch** and minimum **1/2-inch-** wide flanges.
- 1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
- 1. Cold-Rolled Channels: **0.0538-inch** uncoated-steel thickness, with minimum **1/2-inch-** wide flanges, **3/4 inch** deep.
 - 2. Steel Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
 - a. Minimum Base-Steel Thickness: As indicated on Drawings.
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, **7/8 inch** deep.
 - a. Minimum Base-Steel Thickness: As indicated on Drawings.
 - 4. Resilient Furring Channels: **1/2-inch-** deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
- 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
- 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, **1/8 inch** thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 - 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum **1/2-inch** clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs **6 inches** o.c.
- E. Direct Furring:
 1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** o.c.
- F. Z-Shaped Furring Members:
 1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced **24 inches** o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than **12 inches** from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than **1/8 inch** from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counters playing, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Installation Tolerances: Install suspension systems that are level to within **1/8 inch in 12 feet** measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

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. Exterior gypsum board for ceilings and soffits.
3. Tile backing panels.
4. Texture finishes.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Gypsum board, Type X.
2. Gypsum ceiling board.
3. Abuse-resistant gypsum board.
4. Impact-resistant gypsum board.
5. Mold-resistant gypsum board.
6. Glass-mat gypsum sheathing board.
7. Cementitious backer units.
8. Interior trim.
9. Exterior trim.
10. Joint treatment materials.
11. Laminating adhesive.
12. Sound-attenuation blankets.
13. Acoustical sealant.
14. Textured finishes.

B. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.

- 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
- 2. Thickness: **5/8 inch, or as indicated on Drawings.**
- 3. Long Edges: Tapered.

- B. Gypsum Ceiling Board: ASTM C1396/C1396M.

- 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
- 2. Thickness: **1/2 inch, or as indicated on Drawings.**
- 3. Long Edges: Tapered.

- C. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.

- 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
- 2. Core: As indicated on Drawings.

3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 6. Long Edges: Tapered.
 7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- D. Impact-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
 2. Core: As indicated on Drawings.
 3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 6. Hard-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements according to test in Annex A1.
 7. Long Edges: Tapered.
 8. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- E. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
 2. Core: As indicated on Drawings.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 SPECIALTY GYPSUM BOARD

2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

- A. Glass-Mat Gypsum Sheathing Board: ASTM C1177/C1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. PABCO Gypsum.
 - f. USG Corporation.
 2. Core: As indicated on Drawings.

2.6 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. CertainTeed LLC; Saint-Gobain North America.
 - c. Custom Building Products.
 - d. FinPan, Inc.
 - e. James Hardie Building Products, Inc.
 - f. National Gypsum Company.
 - g. USG Corporation.
 2. Thickness: As indicated on Drawings.
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.7 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc .
 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C1047.

1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.8 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Exterior Applications:

1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.9 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C954 for fastening panels to steel members from **0.033 to 0.112 inch** thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
 - D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 - E. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."
 - F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."
 - G. Vapor Retarder: As specified in Section 07 26 00 "Vapor Retarders."
- 2.10 TEXTURE FINISHES
- A. Primer: As recommended by textured finish manufacturer.
 - B. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed LLC; Saint-Gobain North America.
 - b. National Gypsum Company.
 - c. USG Corporation.
 - 2. Texture: Orange peel or to match existing.

PART 3 - EXECUTION

3.1 INSTALLATION AND FINISHING OF PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch-** wide spaces at these locations and trim edges

with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile and panels that are substrate for acoustical tile.
 - 3. Level 3: Walls to receive heavy texture.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- H. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- I. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 29 00

SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Quarry tile.
3. Pressed floor tile.
4. Porcelain tile.
5. Glazed wall tile.
6. Stone thresholds.
7. Tile backing panels.
8. Waterproof membranes.
9. Crack isolation membranes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

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

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs only Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.
4. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of mud floors mud walls membranes shower receptors gauged porcelain tile/gauged porcelain tile panels and slabs and large format tile.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

- A. Factory-Mounted Mosaic Ceramic Tile Type < **see finish schedule** > : Glazed.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Daltile.
 - c. Interceramic.
 2. Composition: Porcelain.
 3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
 4. Module Size: As indicated in Drawings.

5. Thickness: **1/4 inch**.
6. Face: Pattern of design indicated, with cushion edges.
7. Surface: Slip resistant, with abrasive admixture.
8. Dynamic Coefficient of Friction: Not less than 0.42.
9. Finish: As indicated in Drawings for glaze.
10. Tile Color and Pattern: As selected by Architect from manufacturer's full range or as indicated in Drawings .
11. Grout Color: As selected by Architect from manufacturer's full range or as indicated in Drawings .
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size As indicated in Drawings .
 - b. Base Cap: Surface bullnose , module size as indicated in Drawings .
 - c. Wainscot Cap: Surface bullnose , module size as indicated in Drawings .
 - d. External Corners for Thinset Mortar Installations: Surface bullnose , module size as indicated in Drawings .
 - e. Internal Corners: Cove, module size as indicated in Drawings .
 - f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from **1/2 to 1/4 inch** across nominal **4-inch** dimension.

B. Square-Edged Quarry Tile Type < **see finish schedule** > : Unglazed .

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Atlas Minerals & Chemicals, Inc.
 - c. Daltile.
 - d. Interceramic.
 - e. Quarry Tile Co.
 - f. Summitville Tiles, Inc.
2. Face Size: As indicated in Drawings.
3. Thickness: **1/2 inch** .
4. Wearing Surface: as indicated in Drawings .
5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Finish: As indicated in Drawings for glaze.
7. Tile Color and Pattern: As selected by Architect from manufacturer's full range or as indicated in Drawings .
8. Grout Color: As selected by Architect from manufacturer's full range or as indicated in Drawing .
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: Coved with surface bullnose top edge, face size **6 by 6 inches** .
 - b. Wainscot Cap: Surface bullnose, face size as indicated in Drawings .

C. Pressed Floor Tile Type < **see finish schedule** > : Unglazed .

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Daltile.
 - c. Interceramic.
2. Composition: Vitreous or impervious natural clay or porcelain .
3. Face Size: As indicated in Drawings.
4. Face Size Variation: Calibrated or rectified.
5. Thickness: **1/4 inch** .
6. Face: Pattern of design indicated, with square or cushion edges or As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Glaze: as indicated in Drawings .
9. Tile Color and Pattern: as indicated in Drawings .
10. Grout Color: As selected by Architect from manufacturer's full range or as indicated in Drawings .
11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size same as adjoining flat tile or as indicated in Drawings .
 - b. Base Cap: Surface bullnose , module size same as adjoining flat tile or as indicated in Drawings .
 - c. Wainscot Cap: Surface bullnose , module size same as adjoining flat tile or as indicated in Drawings .
 - d. External Corners: Surface bullnose , module size same as adjoining flat tile or as indicated in Drawings .
 - e. Internal Corners: Cove, module size same as adjoining flat tile or as indicated in Drawings .
 - f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from **1/2 to 1/4 inch** across nominal **4-inch** dimension.

D. Porcelain Tile Type < **see finish schedule** > : Unglazed .

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Daltile.
 - c. Interceramic.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: As indicated in Drawings .
4. Face Size Variation: Rectified.
5. Thickness: **1/4 inch** .
6. Face: As indicated in Drawings.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: as indicated in Drawings .
9. Grout Color: As selected by Architect from manufacturer's full range or as indicated in Drawings .

10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size same as adjoining flat tile or as indicated in Drawings .
 - b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile or as indicated in Drawings .
 - c. External Corners: Surface bullnose, module size same as adjoining flat tile or as indicated in Drawings .
 - d. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from **1/2 to 1/4 inch** across nominal **4-inch** dimension.

E. Glazed Wall Tile Type <TBD>:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Daltile.
2. Module Size: As indicated in Drawings .
3. Face Size Variation: Rectified.
4. Thickness: **5/16 inch**.
5. Face: Pattern of design indicated, with manufacturer's standard edges.
6. Finish: As indicated in Drawings for glaze.
7. Tile Color and Pattern: as indicated in Drawings .
8. Grout Color: As selected by Architect from manufacturer's full range or as indicated in Drawings .
9. Mounting:
 - a. Factory, back mounted.
 - b. PregROUTED sheets of tiles are factory assembled and grouted with manufacturer's standard white silicone rubber.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: , module size as indicated in Drawings .
 - b. Wainscot Cap: Surface bullnose , module size as indicated in Drawings .
 - c. External Corners: Surface bullnose, same size as adjoining flat tile.
 - d. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

F. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as used for adjoining wall tile.

1. Color and Finish: as indicated in Drawings .

2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to **1/16 inch** above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to **1/2 inch** or less above adjacent floor surface.
- B. Marble Thresholds: ASTM C503/C503M, with a minimum abrasion resistance of 10 according to ASTM C1353 or ASTM C241/C241M and with honed finish.
 1. Description:
 - a. Uniform, fine- to medium-grained white stone with gray veining.
 - b. Match Architect's sample.
 - c. Provide the following:
 - 1) As indicated in the Drawings .

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. Custom Building Products.
 - c. Georgia-Pacific Gypsum LLC.
 - d. USG Corporation.
 2. Thickness: **1/2 inch, or 5/8 inch where required to match thickness of abutting substrate.**

2.5 WATERPROOF MEMBRANES

- A. General: Manufacturer's standard product , selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Waterproof Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Bostik, Inc.
 - c. C-Cure.
 - d. Custom Building Products.
 - e. H.B. Fuller Construction Products Inc. / TEC.
 - f. Laticrete International, Inc.
 - g. MAPEI Corporation.
 - h. Sika Corporation.
- C. Latex-Portland Cement Waterproof Mortar: Flexible, waterproof mortar consisting of cement-based mix and latex additive.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. C-Cure.
 - c. H.B. Fuller Construction Products Inc. / TEC.
 - d. Laticrete International, Inc.
 - e. MAPEI Corporation.

- D. Waterproofing and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both waterproofing and tile-setting adhesive in a two-step process.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Boiardi Products Corporation; a QEP company.
 - b. Bostik, Inc.

2.6 CRACK ISOLATION MEMBRANES

- A. General: Manufacturer's standard product , selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

- B. Crack Isolation Membrane, Fabric-Reinforced, Fluid-Applied: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. H.B. Fuller Construction Products Inc. / TEC.
 - d. Laticrete International, Inc.
 - e. MAPEI Corporation.

- C. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. C-Cure.
 - c. H.B. Fuller Construction Products Inc. / TEC.
 - d. MAPEI Corporation.

2.7 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Bostik, Inc.
 - c. C-Cure.
 - d. Custom Building Products.
 - e. H.B. Fuller Construction Products Inc. / TEC.
 - f. Laticrete International, Inc.
 - g. MAPEI Corporation.
 2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
 4. For wall applications, provide nonsagging mortar.
- B. Improved Modified Dry-Set Mortar (Thinset) **(For large tile, over 15 inches):** ANSI A118.15.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. C-Cure.
 - c. Custom Building Products.
 - d. H.B. Fuller Construction Products Inc. / TEC.
 - e. Laticrete International, Inc.
 - f. MAPEI Corporation.
 2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
 4. For wall applications, provide nonsagging mortar.

2.8 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout **(For exterior Tile):** ANSI A118.7.
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Bostik, Inc.
 - c. C-Cure.
 - d. Custom Building Products.
 - e. H.B. Fuller Construction Products Inc. / TEC.
 - f. Laticrete International, Inc.
 - g. MAPEI Corporation.

2. Polymer Type:
 - a. Dry, redispersible form, prepackaged with other dry ingredients.
 - b. Liquid-latex form for addition to prepackaged dry-grout mix.
- C. Water-Cleanable Epoxy Grout (**For all Interior Tile**): ANSI A118.3 , with a VOC content of 65 g/L or less.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. C-Cure.
 - c. Custom Building Products.
 - d. H.B. Fuller Construction Products Inc. / TEC.
 - e. Laticrete International, Inc.
 - f. MAPEI Corporation.
- D. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, ASTM A276/A276M or ASTM A666, 300 Series exposed-edge material.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with adhesives bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped **1/4 inch per foot** toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors consisting of tiles **8 by 8 inches** or larger.
 - f. Tile floors consisting of rib-backed tiles.

- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: **1/16 inch** .
 - 2. Quarry Tile: **1/4 inch** .
 - 3. Pressed Floor Tile: **1/4 inch** .
 - 4. Glazed Wall Tile: **1/16 inch** .
 - 5. Porcelain Tile: **1/4 inch** .
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 - 1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in improved modified dry-set mortar (thinset).
 - 2. Do not extend cleavage membrane waterproof membrane or crack isolation membrane under thresholds set in improved modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane waterproof membrane or crack isolation membrane with elastomeric sealant.

- K. Metal Edge Strips: Install at locations indicated, where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- M. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- N. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- O. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 EXTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Exterior Floor Installations:
 - 1. TCNA F101 and ANSI A108.1C : **Cement mortar bed (thickset) over waterproof membrane on concrete where indicated and bonded to concrete where membrane is not indicated.**
 - a. Ceramic Tile Type: **<see finish schedule>**.
 - b. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - c. Grout: High-performance sanded grout.
 - 2. TCNA F102 **< see finish schedule >**: **Thinset mortar over waterproof membrane on concrete where indicated and on concrete where membrane is not indicated.**
 - a. Ceramic Tile Type: **< see finish schedule >**.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance sanded grout.

3.5 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. TCNA F114 and ANSI A108.1C **<see finish schedule >**: **Cement mortar bed (thickset) with cleavage membrane; epoxy grout.**
 - a. Ceramic Tile Type: **<see finish schedule >**.
 - b. Bond Coat for Cured-Bed Method: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.

2. TCNA F115 < **see finish schedule** >: **Thinset mortar; epoxy grout.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
 3. TCNA F121 and ANSI A108.1C < **see finish schedule** >: **Cement mortar bed (thickset) on waterproof membrane; epoxy grout.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Bond Coat for Cured-Bed Method: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
 4. TCNA F122 < **see finish schedule** >: **Thinset mortar on waterproof membrane; epoxy grout.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
 5. TCNA F125 (Full, except where partial coverage is indicated) <**see finish schedule** >: **Thinset mortar on crack isolation membrane.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
- B. Interior Wall Installations, Masonry or Concrete:
1. TCNA W202 < **see finish schedule** >: **Thinset mortar.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
 2. TCNA W211 and ANSI A108.1C < **see finish schedule** >: **Cement mortar bed (thickset) bonded to substrate.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Bond Coat for Wet-Set Method: Improved modified dry-set mortar.
 - c. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - d. Grout: Water-cleanable epoxy grout.
 3. TCNA W221 and ANSI A108.1C < **see finish schedule** >: **Cement mortar bed (thickset) on metal lath over waterproof membrane.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Bond Coat for Wet-Set Method: Improved modified dry-set mortar.
 - c. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - d. Grout: Water-cleanable epoxy grout.
- C. Interior Wall Installations, Wood or Metal Studs or Furring:
1. TCNA W221 and ANSI A108.1C < **see finish schedule** >: **Cement mortar bed (thickset) on solid backing.**
 - a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Bond Coat for Wet-Set Method: Improved modified dry-set mortar.
 - c. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - d. Grout: Water-cleanable epoxy grout.
 2. TCNA W222 and ANSI A108.1C < **see finish schedule** >: **One-coat cement mortar bed (thickset) over waterproof membrane on solid backing.**
 - a. Ceramic Tile Type: < **see finish schedule** >.

- b. Bond Coat for Wet-Set Method: Improved modified dry-set mortar.
 - c. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - d. Grout: Water-cleanable epoxy grout.
3. TCNA W244C or TCNA W244F < **see finish schedule** >: **thinset mortar on cementitious backer units or fiber-cement backer board over vapor-retarder membrane.**
- a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
- D. Bathtub/Shower Wall Installations, Wood or Metal Studs or Furring:
1. TCNA B412: **thinset mortar on cementitious backer units.**
- a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
- E. Shower Receptor and Wall Installations:
1. TCNA B415 < **see finish schedule** >: **thinset mortar on waterproof membrane over cementitious backer units.**
- a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
2. TCNA B420 < **see finish schedule** >: **thinset mortar on.**
- a. Ceramic Tile Type: < **see finish schedule** >.
 - b. Thinset Mortar: Modified dry-set or Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.

END OF SECTION 09 30 13

SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

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 seismic restraints for ceiling systems.

- B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS (**General Dry Area Ceiling Tiles: SA-1**)

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. Armstrong Ceiling & Wall Solutions.
 - 3. CertainTeed LLC; Saint-Gobain North America.
 - 4. Rockfon (Rockwool International).
 - 5. USG Corporation.
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
- C. Classification: **Armstrong, Calla, Square Lay-In Smooth Texture.**
- D. Color: White.
- E. Light Reflectance (LR): **0.85.**
- F. Ceiling Attenuation Class (CAC): **35.**
- G. Noise Reduction Coefficient (NRC): **0.85.**
- H. Articulation Class (AC): **170.**
- I. Edge/Joint Detail: **Square.**
- J. Thickness: **1 inch.**
- K. Modular Size: **24 by 48 inches.**

2.3 ACOUSTICAL PANELS (**Wet Areas - Kitchen/Bathrooms: SA-2**)

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. Armstrong Ceiling & Wall Solutions.
 - 3. CertainTeed LLC; Saint-Gobain North America.

4. Rockfon (Rockwool International).
 5. USG Corporation.
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
- C. Classification: **Armstrong, Kitchen Zone, Square Lay-In Smooth Texture.**
- D. Color: White.
- E. Light Reflectance (LR): **0.89.**
- F. Ceiling Attenuation Class (CAC): **33.**
- G. Noise Reduction Coefficient (NRC): **NA.**
- H. Articulation Class (AC): **NA.**
- I. Edge/Joint Detail: **Square.**
- J. Thickness: **5/8 inch.**
- K. Modular Size: **24 by 48 inches.**

2.4 METAL SUSPENSION SYSTEM <Insert drawing designation>

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Armstrong Ceiling & Wall Solutions.
 2. CertainTeed LLC; Saint-Gobain North America.
 3. Rockfon (Rockwool International).
 4. USG Corporation.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, **G30** coating designation; with prefinished **15/16-inch-** wide metal caps on flanges.
1. Structural Classification: Intermediate -duty system.
 2. End Condition of Cross Runners: butt-edge type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted white or Painted in color as selected from manufacturer's full range.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM <Insert drawing designation>

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed LLC; Saint-Gobain North America.
 - 3. Fry Reglet Corporation.
 - 4. Rockfon (Rockwool International).
 - 5. USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to long axis of space.
 - c. Install panels in a basket-weave pattern.
4. Install hold-down impact and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 09 51 13

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SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Thermoplastic-rubber base.
 2. Rubber stair accessories.
 3. Rubber molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 THERMOPLASTIC-RUBBER BASE

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. Johnsonite; a Tarkett company.
 3. Roppe Corporation; Roppe Holding Company.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
1. Group: I (solid, homogeneous) or II (layered).
 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
- C. Thickness: **0.125 inch**.
- D. Height: **4 inches 6 inches** as indicated on Drawings.
- E. Lengths: Cut lengths **48 inches** long or coils in manufacturer's standard length.

- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors: As indicated in Drawings, or as selected by Architect from Manufacturer's full range of colors.

2.3 RUBBER STAIR ACCESSORIES <Insert drawing designation>

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation; Roppe Holding Company.
- C. Stair Treads: ASTM F 2169.
 - 1. Type: TS (rubber, vulcanized thermoset) .
 - 2. Class: 1 (smooth, flat) 2 (pattern; embossed, grooved, or ribbed).
 - 3. Group: 1 (embedded abrasive strips) or 2 (with contrasting color for the visually impaired).
 - 4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 - 5. Nosing Height: [2 inches].
 - 6. Thickness: 1/4 inch and tapered to back edge.
 - 7. Size: Lengths and depths to fit each stair tread in one piece.
 - 8. Integral Risers: Smooth, flat; in height that fully covers substrate.
- D. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
 - 1. Style: Coved toe, 7 inches high by length matching treads.
 - 2. Thickness: 0.125 inch or Manufacturer's standard.
- E. Stringers: Height and length after cutting to fit risers and treads and to cover stair stringers, produced by same manufacturer as treads, and recommended by manufacturer for installation with treads.
 - 1. Thickness: Manufacturer's standard.
- F. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- G. Locations: Provide rubber stair accessories in areas indicated.

- H. Colors and Patterns: As indicated in Drawings, or as selected by Architect from Manufacturer's full range of colors.

2.4 RUBBER MOLDING ACCESSORY <Insert drawing designation>

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. Roppe Corporation; Roppe Holding Company.
 - 2. VPI Corporation.
- B. Description: Rubber stair-tread nosing cap for cove carpet cap for cove resilient floor covering carpet bar for tackless installations carpet edge for glue-down applications nosing for carpet nosing for resilient floor covering reducer strip for resilient floor covering joiner for tile and carpet transition strips.
- C. Profile and Dimensions: As required for flooring conditions.
- D. Locations: Provide rubber molding accessories in areas indicated or as required for flooring conditions.
- E. Colors and Patterns: As indicated in Drawings, or as selected by Architect from Manufacturer's full range of colors.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. **Verify adhesives have a VOC** content of **50 g/L or less and 60 g/L or less for rubber stair treads.**
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed **1000 sq. ft.** , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 2.5 lbs., of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches** in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches** in length.
 - a. corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Floor Polish (Vinyl products only): Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply two coat(s).
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 13

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SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Modular carpet tile.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

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

- B. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

- C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE <See Finish Schedule>

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Interface, LLC.
 2. Mannington Mills, Inc.
 3. Mohawk Group (The); Mohawk Carpet, LLC.
 4. Patcraft; a division of Shaw Industries, Inc.
 5. Shaw Contract Group; a Berkshire Hathaway company.
 6. Tandus; a Tarkett company.
- B. Color: As indicated in Drawings.
- C. Pattern: As indicated in Drawings .
- D. Fiber Content: 100 percent nylon 6, 6 100 percent nylon 6 .
- E. Fiber Type: As indicated in Drawings .
- F. Pile Characteristic: Level-loop pile.
- G. Yarn Twist: <Insert TPI>.
- H. Yarn Count: <Insert count>.
- I. Density: 6,500.
- J. Pile Thickness: 0.144 inches (3.66 mm) for finished carpet tile according to ASTM D6859.
- K. Stitches: 8.3 per inch.
- L. Gage: 1/8 (31.50 rows per 10 cm) .

- M. Surface Pile Weight: **26.0 oz. per sq. yd.** .
- N. Total Weight: for finished carpet tile. **< See Finish Schedule >**
- O. Primary Backing/Backcoating: **< See Finish Schedule >**.
- P. Secondary Backing: Manufacturer's standard material or As indicated in Drawings .
- Q. Backing System: **See Finish Schedule.**
- R. Size: **As indicated in Drawings.**
- S. Performance Characteristics:
 - 1. Appearance Retention Rating: **Severe traffic**, 3.5 minimum according to ASTM D7330.
 - 2. Dry Breaking Strength: Not less than **100 lbf** according to ASTM D2646.
 - 3. Tuft Bind: Not less than **10 lbf** according to ASTM D1335.
 - 4. Delamination: Not less than **3.5 lbf/in.** according to ASTM D3936.
 - 5. Dimensional Tolerance: Within **1/32 inch** of specified size dimensions, as determined by physical measurement.
 - 6. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
 - 7. Noise Reduction Coefficient (NRC): **?** according to ASTM C423.
 - 8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
 - 9. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
 - 10. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
 - 1. Verify adhesives have a VOC content of **50 g/L** or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:

1. Moisture Testing: Perform tests so that each test area does not exceed **1000 sq. ft.** , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate **of 2.5 lb of water/1000 sq. ft.** in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum **75** percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch** wide or wider, and protrusions more than **1/32 inch** unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive .
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.

- D. Maintain pile-direction patterns indicated on Drawings or as recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

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SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Painting as specified and as noted on Drawings.
 - 2. Surfaces requiring finishing and left unfinished by the requirements of other Sections shall be painted or finished as part of the Work of this Section.

1.02 DEFINITIONS

- A. Touch-Up: Painting of items missed by painter at no additional cost to Owner.
- B. Re-Paint: Repairs to paint work for damages caused by other trades.
- C. Properly Painted Surfaces: Surface that is uniform in appearance, color, sheen, and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, splatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of five feet minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
- D. Damage Caused by Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
- E. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

1.03 SUBMITTALS

- A. Product Data: Submit schedule of manufacturers of products required for the Work, together with specifications recommended by each manufacturer.
- B. Samples: Submit samples of each type of finish specified.
 - 1. Architect will furnish Contractor a color schedule of colors selected either from manufacturer's stock colors or specially requested color mixes before Work is begun.
 - 2. Submit two 8 inch x 10 inch samples of each color, including the correct sheen and texture, on heavy cardboard or masonry. Submit sealer and stain finishes on material of the same quality and species of wood on which that particular finish shall be used. Rejected samples shall be resubmitted until approved.
 - 3. Samples shall be submitted at least 30 days prior to the start of painting work. Label and identify each sample as to location and application. Upon submittal of color samples, minor variations or changes in color selection may be requested by the Architect and new samples ordered, until final color approval.

1.04 QUALITY ASSURANCE

- A. Standards: Preparation, application and workmanship shall be in accordance with manufacturer's recommendations and applicable provisions of the following:
 - 1. Master Painters Institute (MPI) Architectural Painting Specification Manual.

2. Gypsum Association - GA210, "Gypsum Board for Walls and Ceilings."
- B. MPI Grade: All work shall be performed in accordance with MPI Premium Grade Finish requirements.
- C. Design Criteria: Systems specified are in addition to prime coats provided under other Specification Sections of the Project Manual.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's sealed containers, with Manufacturer's original legends and labels, intact on each container.
- B. Storage: Store all materials in one location.
 1. Adequately protect against damage while stored at site.
 2. In no case shall the amount or method of materials stored exceed the amount permitted or the manner allowed by local ordinances, state laws, or fire underwriter regulations. Maintain storage area at 55 degrees fahrenheit minimum.

1.06 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Do not apply exterior paint in damp or rainy weather or until after the surface has dried thoroughly from the effects of such weather.
 1. Perform painting operations at temperature and humidity conditions recommended by the Manufacturer for each operation and product.
 1. Do not apply varnish or paint when temperature is below 50 degrees F.. Avoid painting surfaces exposed to hot sunlight.
 2. During interior application, maintain minimum temperature of 65 degrees F. unless otherwise directed by Architect or manufacturer's printed instructions. Hold temperature as constant as possible.
 3. Provide adequate ventilation at all times so the humidity cannot rise above the dew point of the coldest surface to be painted.
 4. Moisture-containing surfaces, such as concrete, stucco and cement plaster shall have a moisture content of less than 8 percent as measured by moisture meter. Remove surface salt deposits prior to painting. Verify that pH is neutral, or within acceptable limits of Paint Manufacturer. Paint after thoroughly cured.
 5. Apply painting systems at lighting level of 540 lux (50 foot candles) minimum on surfaces to be painted. Inspection of painting work shall take place under the same lighting conditions as application. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in Article 1.02 of this section and the MPI Architectural Painting Specification Manual.

1.07 MAINTENANCE

- A. Extra Materials: Upon completion of the Work, furnish Owner with one fresh gallon of each type and color of paint and finish used on this Project, including primers and undercoats used. Label containers with manufacturer's name, batch, color, shelf life, instructions, and cautions. Provide materials in manufacturer's original containers with original labels intact.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following manufacturers, except as otherwise approved by Architect, subject to compliance with specification requirements.
 - 1. Dunn-Edwards Corporation www.dunnedwards.com
 - 2. Frazee Paint Company www.sherwin-williams.com/frazee
 - 3. Glidden (ICI Paints) www.glidden.com
 - 5. PPG www.ppg.com
 - 6. Sherwin Williams www.sherwin-williams.com
 - 7. Tnemec www.tnemec.com
 - 8. Benjamin Moore www.benjaminmoore.com

2.02 MATERIALS

- A. Materials used for any painting system shall be from a single manufacturer, unless approved otherwise in writing by painting system manufacturer. Include such approval in Product Data submittal.
- B. Provide materials in accordance with the Schedule of Paint Products at the end of this Section as applicable to project. Contractor shall provide either waterborne or solventborne products at contractor's option and as follows:
 - 1. Waterborne:
 - a. Provide where low odor and fast dry are desired.
 - b. Non-blocking materials shall be used for doors, door jambs, railings and other locations subject to handling, or where surfaces will come into contact with other painted surfaces or belongings.
 - 2. Solventborne:
 - a. Provide where harder finish is required (such as "wet" areas) and odor will not create problems with occupants.
 - b. These products shall not be used where color retention is a concern. Verify with Architect.
 - 3. Materials used shall comply with applicable Federal and local air pollution regulations, lead content laws, and current VOC requirements. If products listed in Schedule of Paint Products located at the end of this Section are not in compliance with regulations, laws, or requirements, Contractor shall notify Architect and shall provide information regarding substitute products.
- C. Basic painting materials such as linseed oil, shellac, turpentine, thinners, driers, and other similar products, shall be of highest quality, be compatible with other coating materials, made by reputable, recognized manufacturers, and have identifying labels on containers. Paint materials shall be factory fresh.
- D. Alternate materials submitted for prior approval shall have qualities and materials equal to the other listed manufacturer's scheduled, top of the line, first quality products. Materials selected for coating systems for each type of surface shall be the products of a single manufacturer.
- D. Standard Gloss Range: Provide paints in accordance with the following MPI standard ranges as measured in accordance with ASTM D523, and as indicated on the drawings:

<u>MPI Gloss and Sheen Standards</u>	<u>Gloss @ 60°</u>	<u>Sheen @ 85°</u>
Gloss Level 1 – traditional matte finish – flat	max. 5 units, and	max. 10 units
Gloss Level 2 – high side sheen flat – 'velvet-like' finish	max. 10 units, and	10-35 units
Gloss Level 3 – traditional 'eggshell-like' finish	10-25 units, and	10-35 units

Gloss Level 4 – ‘satin-like’ finish	20-35 units, and	min. 35 units
Gloss Level 5 – traditional semi-gloss	35-70 units	
Gloss Level 6 – traditional gloss	70-85 units	
Gloss Level 7 – a high gloss	more than 85 units	

- E. Paints shall be ready mixed except for field catalyzed coatings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine and test subsurfaces to receive Work for adhesion of painting and coating systems. Report in writing with a copy to Architect, conditions detrimental to Work. Do not apply painting and coating systems until such adverse conditions are corrected by party responsible for adverse conditions. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.02 PROTECTION

- A. Before painting, remove hardware, accessories, electrical plates, lighting fixtures and similar items and protect.
1. Provide “Wet-Paint” signs and other barricades and protections as required to protect adjacent surfaces and work of other trades, whether being painted or not.
 2. Mask permanent labels.
 3. Provide, distribute, and maintain a sufficient supply of clean drop cloths and other protective coverings.
 4. Protect foliage and other exterior finished surfaces from contact with cleaning materials and thoroughly flush with water after contact.
 5. On completion of each space, replace above items.
 6. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.

3.03 SURFACE PREPARATION

- A. General: Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting/coating system specified, unless instructed differently in Contract Documents. Notify Architect in writing of any conflicts.
1. Surfaces requiring painting or finishing shall be thoroughly dry and cured, free of dirt, dust, rust, stains, scale, mildew, wax, grease, oil, deteriorated substrates, bond-breakers, efflorescence and other foreign matter detrimental to the coating’s adhesion and performance. Repair voids, cracks, nicks and other surface defects with appropriate patching material. Finish flush with surrounding surfaces and match adjacent finish texture.
 2. Spot prime marred or damaged shop coats on metal surfaces with appropriate metal primer.
 3. Determine moisture content of plaster, stucco, cementitious materials, wood and other moisture-holding materials by use of a reliable electronic moisture meter.
 4. Determine alkalinity of plaster, stucco and other cementitious materials by performing appropriate tests.
 5. Do not paint surfaces where moisture content or alkalinity exceeds that which is allowed by paint manufacturer.

6. Do not perform exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting.
- B. Existing Surfaces:
1. Clean, sand, patch, repair and prepare existing surfaces to be painted so that such existing finished surfaces are indistinguishable from new surfaces.
 2. Surfaces which cannot be prepared or painted as specified shall be immediately brought to the attention of the Architect in writing.
 3. Remove loose peeling and checked paint.
 4. Remove mildew by washing the surface with a commercially available mildew killer/remover.
 5. Remove efflorescence by wire brushing, power brushing or washing. Thoroughly rinse surfaces wire brushed. After removal of efflorescence, wash the surface with a commercially available cleaner acceptable to the manufacturer of the substrate.
 6. Remove existing wallcovering and wash the surface to remove paste residue. Seal surface before making any surface repairs.
 7. Dull and roughen glossy surfaces to obtain proper adhesion by either sanding, washing with a tri-sodium phosphate solution, or treating with a liquid deglossing compound.
 8. Overlap and feather edge spot-primed areas.
- C. Wood:
1. Sandpaper to smooth and even surface and then dust off. After primer or stain coat has been applied, thoroughly fill nail holes and other surface imperfections with putty tinted with primer or stain to match wood color. Sand woodwork between coats to a smooth surface. Cover knots and sap streaks with a thin coat of shellac, or seal with a suitable stain blocking sealer.
 2. Finish door and window edges after final fitting. Finish interior of cabinets in the same manner as the exterior unless otherwise specified. Seal interior of drawers unless otherwise specified.
 3. Back priming:
 - a. Back prime exterior woodwork, which is to receive paint finish, with exterior primer paint.
 - b. Back prime interior woodwork, which is to receive paint or enamel finish, with enamel undercoated paint.
 - c. Back prime interior and exterior woodwork, which is to receive stain and/or varnish finish with VOC compliant varnish acceptable to the Architect.
 - d. Back-prime wood trim before installation.
 4. Where existing stained surfaces are indicated to be coated with a transparent stain, test apply stain to small area where directed by Architect and obtain Architects approval of color.
- D. Steel and Iron:
1. Remove grease, oil, mill scale, rust and rust scale and touch-up chipped or abraded places on items that have been shop coated. Remove and reprime incompatible or damaged shop applied primers. Comply with the Steel Structures Painting Council's (SSPC) recommendations for cleaning of uncoated steel and iron surfaces.
 2. When area will be exposed to view, sandpaper the entire primed area smooth, feather the edge of surrounding undamaged prime coat and spot prime in a manner to eliminate evidence of repair.
 3. Where steel or iron at existing Work have a heavy coating of scale, remove by sand blasting, sanding, descaling, grinding or wire brushing, as necessary, to

produce a satisfactory surface for painting.

- E. Galvanized Metal and Aluminum:
 - 1. Thoroughly clean by wiping surfaces with a non-hydrocarbon solvent that will not leave an oily residue. Apply surface conditioner or vinyl-wash pretreatment as required for proper adhesion if required by paint manufacturer. Prime galvanized metal with galvanized iron primer as recommended by paint manufacturer. A test sample of the complete painting system should be applied and checked for adhesion before final painting begins.
 - 2. Clean visible portions of throats of galvanized steel ductwork with solvent; wipe dry with clean rags and paint flat black.

- F. Concrete:
 - 1. The method of surface preparation shall be at Contractor's discretion, provided the results are satisfactory to the Architect, and the method is in compliance with applicable codes and requirements.
 - 2. Clean and prepare surfaces of tilt-up precast concrete wall panels to be painted by power washing surface to remove all efflorescence, chalk, dust, dirt, grease, oils and release agents.
 - 3. Repair surfaces to be painted prior to application of prime and finish coat(s). Apply a tinted primer to the substrate to help identify surface imperfections. After the primer has thoroughly dried, patch, fill and repair surface imperfections to match and flush-out with adjacent finish texture and profile.
 - 4. Before first paint coat is applied, spot prime nails and other exposed metal occurring in the surfaces with a rust inhibitive primer as recommended by paint manufacturer.
 - 5. Except for steam cured products, cure cement type surfaces from 60 to 90 days in accordance with Paint Manufacturer's recommendations before painting.

- G. Plaster and Gypsum Board Surfaces:
 - 1. Fill cracks, holes or imperfections with compatible patching material and smooth off to match adjoining surfaces. Before painting, surfaces shall be first tested for dryness with a moisture testing device.
 - 2. Apply no paint or sealer on gypsum board or plaster when the moisture content exceeds 8 percent. Test sufficient areas in each space and as often as necessary to determine if the surface has the proper moisture content for painting. If the moisture content is between 8 percent and 12 percent, prime with alkali resistant primer.
 - 3. If 8 percent or less, prime with specified primer. Remove the dry salt deposits from plaster surfaces by brushing with a stiff brush before painting.

- H. Acoustical Surfaces (Lay-in acoustical ceiling panels, acoustical wall panels, etc.):
 - 1. Thoroughly vacuum clean surfaces to remove dust and debris from acoustical surface pores. Use a soft brush attachment that will not damage or loosen acoustical surface.
 - 2. Seal surface stains with a suitable stain blocking sealer that will not fill pores of acoustical surface.

3.04 WORKMANSHIP

- A. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spread rates for specified products as recommended by the Manufacturer, but not less than as specified for each paint system.
- B. Apply each coat of paint evenly and comply with manufacturer's drying time before applying subsequent coats.

- C. Touch up suction spots after application of first finish coat.
- D. Finished work shall be uniform, match approved color, texture and coverage, and free from runs, sags, clogging or excessive flooding. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping. Where varnishes or enamel is used, lightly sand, dust and clean undercoats to obtain a smooth finish coat. Sand carefully between each coat of finish as necessary to provide even, smooth surfaces and for good adhesion of subsequent coats.
- E. Where clear finishes are required, ensure tinted fillers match wood. Work fillers well into the grain before set. Wipe excess from the surface.
- F. Where specific mil thicknesses are required, check thickness by the following methods:
 - 1. Over ferrous metal - Elecometer Film Gauge
 - 2. Other surfaces - Tooke Dry Mil Inspection Gauge
- G. Finished work shall be a "Properly Painted Surface" as defined in this Section.

3.05 APPLICATION

- A. The number of coats scheduled is the minimum number of coats required. Additional coat(s) shall be applied, at no additional cost to the Owner, to completely hide base material, provide uniform color and to produce satisfactory finish results.
- B. Apply coatings without thinning except as specifically required by label directions, or required by these specifications. In such cases, thinning shall be the minimum reduction permitted.
- C. Priming will not be required on items delivered with prime or shop coats, unless otherwise specified, or if shop applied prime coat is not compatible with specified painting system. Touch up prime coats applied by others as required to ensure an even primed surface before applying finish coat.
- D. Block Fillers: Provide level of block fill as scheduled to conform with the following:
 - 1. Level 1 – Regular Fill: Minimum block fill, reduces irregularity in masonry profile. One coat, spray applied.
 - 2. Level 2 – Medium Full Fill: Masonry profile slightly reduced. One coat, spray applied and back-rolled.
 - 3. Level 3 – Full Fill: Minimum block fill required for semi-gloss and gloss finishes. Use where conformance with health regulations is required. Number of coats as required to conceal most of masonry texture, spray applied and back-rolled.
 - 4. Level 4 – High Density Fill: Minimum of three coats. 1st coat massaged and forced into masonry texture to assure uniform high density. 2nd coat, with build sufficient to fully conceal masonry texture and joints. Additional coats as required to level. Spray apply coats, back-roll and squeegee final coat. Add sand to final coat to achieve light sand texture where indicated.
- E. Plumbing, Mechanical and Electrical:
 - 1. Exterior and interior exposed water, gas, waste piping, sprinkler piping, conduit, lighting and electrical panels, telephone terminal boxes, galvanized ducts and insulated ducts, shall be painted in areas other than mechanical rooms, unless otherwise scheduled.
 - 2. Paint exposed unfinished fixtures, metal ducts, switch boxes, control panels, devices, starters, junction boxes, vents, drains, and other similar items, as directed by Architect.

- F. Spray paint prime coated (not pre-finished) grilles and registers with enamel or lacquer to match walls and ceilings. Paint materials shall not sag, run or bind movable parts of grilles, registers, louvers, baffles and other similar items.
 - 1. Throats of ducts shall be given one coat of flat black paint, wherever visibility of the interior of the duct is allowed through registers or other similar items. At fiber lined duct, use black latex paint.
 - 2. Examine the Mechanical and Electrical Drawings and Specifications to determine the amount of exposed work to be painted.
- G. Paint exposed surfaces of every member, paint items inaccessible after installation before installation, if required to be painted. Paint all exposed surfaces of overhead roof or floor structures, including deck, except where specifically indicated not to be painted.
- H. Edges, tops, and bottoms of wood doors shall be sealed and finished with the same finish as the door faces, to meet door manufacturer's warranty requirements. Verify edge color with Architect as different colors may be selected for each face.
- I. Paint items fitted with finish hardware after hardware has been temporarily removed.
- J. Heating and other equipment on or adjacent to walls or surfaces scheduled for painting shall be disconnected, using workmen skilled in appropriate trades and moved temporarily to permit painting of surface. Following completion of painting, replace and reconnect items.
- K. In multiple coat paint work, tint each succeeding pigmented coat with slightly lighter color, but approximating shade of final coat, to facilitate checking application of specified number of coats. Tint final coat to scheduled and approved color. Tint prime and undercoats to a color similar to finish coat. Each coat of material applied must be inspected and approved by the Architect before the application of the succeeding specified coat; otherwise no credit for the concealed coat will be given, and the Contractor shall assume the responsibility to recoat work in question. Contractor shall notify the Architect when each coat is completed.
- L. Brush, wipe or roll stain in 2 coat application. Avoid lap marks by maintaining "wet-edge" continually being merged with existing liquid coverage and stop only at natural edges, turns and breaking places.
- M. Do not paint over Underwriters' Laboratory labels, fusible links, exposed sprinkler heads and other similar items.
- N. Paint piping, electrical or other equipment, conduit, vents and other similar items, on roof or other exterior locations as directed by Architect.
- O. Finish closets and the interior of cabinets with same color as adjoining rooms, unless otherwise specified. Finish other surfaces same as nearest or adjoining surfaces, unless otherwise shown or scheduled.
- P. Paint surface of walls which will be concealed by cabinets and other items mounted on or attached to walls.

3.06 ADJUSTING

- A. Correct deficiencies in workmanship required to leave surfaces in conformance with "Properly Painted Surface" as defined in this Section.

3.07 CLEANING

- A. During the course of the Work, and upon completion, remove misplaced paint and stain spots or spills from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition. Remove debris caused by work of this Section from premises. Leave Work in clean condition acceptable to Architect.
- B. Remove oily rags and waste daily, taking precaution to prevent fire.

3.08 SCHEDULES

- A. Color Schedule:
 - 1. Architect will provide a complete schedule of colors. Colors may be selected from various manufacturers' color palettes. Manufacturer supplying paint shall match these colors. Contractor shall prepare duplicate set of samples of treatments for major surfaces. If a specific surface or item receiving a paint finish does not have a specific color indicated or selected by the Architect, obtain clarification from the Architect. Do not assume the confirmation of the same color on the adjacent surfaces.
 - 2. Final coat of paint shall not be applied until colors have been approved by the Architect.
- B. Schedule of Finishes: Refer to the "Finish Schedule" on the Drawing for designated finishes of areas.
- C. Finishing of the following listed items and materials will not be required and shall be protected:
 - 1. Stainless Steel, brass, bronze, copper, nickel, monel metal, chromium, anodized aluminum; specially finished articles such as porcelain enamel, plastic coated fabrics, and baked enamel, unless otherwise indicated.
 - 2. Finished products such as ceramic tile, glass, stone and stone tile, brick, resilient flooring and acoustical tiles, board and metal tees.
 - 3. Pre-finished products such as wood doors, operable partitions, wood casework, bleachers, elevator cabs, and similar items.

3.09 EXTERIOR PAINT FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 101 (Ferrous Metals): Apply to exposed steel such as beams and column connectors, metal doors and frames, grilles, light fixture standards in parking areas, metal handrails, sectional and coiling doors, canopy overhangs and other exposed miscellaneous ferrous metals that are not pre-finished. Refer to High Performance Finish System Article 3.11 for high performance paint finish applied to exterior steel framed canopy structures indicated to be painted and not otherwise prefinished.
 - 1. 1st Coat: Ferrous Metal Primer (Red or White color as applicable to finish coats).
 - 2. 2nd Coat: Same material as 3rd coat in accordance with manufacturer's recommendations.
 - 3. 3rd Coat:
 - a. Flat: Paint - Waterborne (100% Acrylic) (if noted on Drawings). Sheen shall be 4 to 6% per a 85 degree gloss meter.
 - b. Semi-Gloss unless noted otherwise. Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).

- C. System 102 (Galvanized Metals): Apply to exposed galvanized metal such as copings, louvers and metal flashings. Refer to High Performance Finish System Article 3.11 for high performance paint finish applied to exterior steel framed canopy structures indicated to be painted and not otherwise prefinished.
1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment (if required by paint manufacturer).
 2. 1st Coat: Galvanized Metal Primer.
 3. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 4. 3rd Coat:
 - a. Flat: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise.
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).
- D. System 103 (Aluminum): Apply to exterior louvers and other miscellaneous exposed exterior unfinished aluminum surfaces.
1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment.
 2. 1st Coat: Aluminum Primer.
 3. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 4. 3rd Coat:
 - a. Flat: Paint, Flat - Waterborne (100% Acrylic) (if noted on Drawings) Sheen shall be less than 10% per a 85 degree gloss meter.
 - b. Semi-Gloss unless noted otherwise. Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).
- E. System 104 (Concrete Masonry Units): Apply to exterior concrete masonry unit construction indicated to be painted. (Refer to Section 07 19 00 "Water Repellents and Masonry Stains" for use on concrete masonry units indicated to be stained.) Roller apply 2nd or 3rd coat.
1. 1st Coat: Concrete Masonry Block Filler. Provide Level 2 or 3 Fill as required by gloss.
 2. 2nd Coat: Same material as 3rd Coat as recommended by manufacturer.
 3. 3rd Coat:
 - a. Flat: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 85 degree gloss meter. One of the coats shall be roller applied.
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).
- F. System 105 (Concrete and Stucco): Apply to exterior cementitious surfaces as indicated or noted, including tilt-up precast concrete. Precast concrete lintels, beams, caps, sills, etc. at exterior of buildings shall not be painted, unless specifically noted. Roller apply 2nd or 3rd coat.
1. 1st Coat: Concrete and Masonry Primer.
 2. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 3. 3rd Coat:
 - a. Flat: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 85 degree gloss meter. One of the coats shall be roller applied.

- b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss (if noted on Drawings): Enamel, Gloss – Waterborne (100% Acrylic - Non-Blocking).
- G. System 106 (Exterior Wood): Apply to wood fascias, soffits, trim, wood posts, columns, beams and exposed trim and framing where indicated to be painted.
- 1. 1st Coat: Exterior Wood Primer - Waterborne (100% Acrylic) unless noted otherwise.
 - 2. 2nd and 3rd Coats:
 - a. Flat - Rough-Sawn Wood: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 60 degree gloss meter.
 - b. Semi-Gloss - Smooth Surface Wood (if noted on Drawings): Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - c. Gloss - Smooth Surface Wood (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).
- H. System 107 (Exterior Gypsum Board): Apply to exterior grade gypsum board soffits.
- 1. 1st Coat: Exterior Gypsum Board Primer/Undercoater – Waterborne unless noted otherwise.
 - 2. 2nd and 3rd Coats: Flat Paint - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 85 degree gloss meter. One of the coats shall be roller applied.
- I. System 108 (Sealer - Masonry Parapet Top Surfaces): Apply in accordance with manufacturer's printed instructions.
- 1. 1st Coat: Tamms Industries (Euclid Chemical Company) "Tammolastic" elastomeric acrylic resin based coating, or VIP Ter Polymer Sealants 5000 series. (These products are not listed in the Schedule of Paint Products located at the end of this Section.)
 - 2. 2nd Coat: Same material as 3rd coat.
 - 3. 3rd Coat: VIP Last-O-Coat 8000 series.

3.10 INTERIOR PAINT FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 201 (Ferrous Metals): Apply to exposed metals such as steel doors, hollow metal frames, metal beam saddles, columns, grilles and registers, stair and hand railings, ladders, and other exposed miscellaneous metals.
- 1. 1st Coat: Ferrous Metal Primer (Red or White color as applicable to finish coats).
 - 2. 2nd Coat: Same material as 3rd Coat as recommended by manufacturer.
 - 3. 3rd Coat:
 - a. Eggshell: Enamel, Eggshell.
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss.
 - c. Gloss (if noted on Drawings): Enamel Gloss.
- C. System 202 (Interior Wood Finishes - Enamel): Apply to wood door frames, columns, exposed and concealed casework and millwork, wood-window wall construction, medium density plywood surfaces, shelving, roll-up wood doors, perforated and plain type hardboard, particleboard and other exposed miscellaneous wood and trim, except wood specified for a transparent or stain finish.
- 1. 1st Coat: Enamel Undercoater.
 - 2. 2nd and 3rd Coat:
 - a. Eggshell: Enamel, Eggshell

- b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss
 - c. Gloss (if noted on Drawings): Enamel, Gloss
- D. System 203 (Interior Wood Finish - Flat): Apply to plywood telephone backing boards and other miscellaneous softwood as noted, specified or scheduled.
- 1. 1st Coat: Enamel Undercoater/Primer.
 - 2. 2nd and 3rd Coat: Flat Paint, - Waterborne (Vinyl Acrylic)
- E. System 204 (Galvanized Metals): Apply to exposed galvanized metal.
- 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment (if required by paint manufacturer)
 - 2. 1st Coat: Galvanized Metal Primer
 - 3. 2nd and 3rd Coats:
 - a. Eggshell: Enamel, Eggshell
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss
 - c. Gloss (if noted on Drawings): Enamel Gloss
- F. System 205 (Aluminum): Apply to interior louvers and other miscellaneous exposed unfinished aluminum surfaces.
- 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment.
 - 2. 1st Coat: Aluminum Primer
 - 3. 2nd and 3rd Coats:
 - a. Eggshell: Enamel, Eggshell
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss
 - c. Gloss (if noted on Drawings): Enamel, Gloss
- G. System 206 (Gypsum Board, Plaster and Concrete - Wet Areas): Apply to gypsum board, plaster and concrete surfaces in toilet rooms, janitor rooms, kitchens, and other areas as scheduled.
- 1. 1st Coat: Enamel Undercoater - Solventborne, unless noted otherwise.
 - 2. 2nd and 3rd Coats:
 - a. Eggshell (if noted on Drawings): Enamel, Eggshell - Solventborne.
 - b. Semi-Gloss: Enamel, Semi-Gloss - Solventborne or Enamel - Solventborne (Epoxy-Polyester).
- H. System 207 (Gypsum Board, Plaster and Concrete - Non-Wet Areas): Apply to gypsum board, plaster and concrete except for wet areas.
- 1. 1st Coat: Waterborne Primer/Sealer. (Solventborne {Alkyd} shall be used at new untextured smooth gypsum board surfaces covered with powdery or unstable soft top joint cement)
 - 2. 2nd and 3rd Coat:
 - a. Eggshell: Enamel, Eggshell
 - b. Semi-Gloss (if noted on Drawings): Enamel, Semi-Gloss
 - c. Flat (if noted on Drawings): Paint, Flat
- I. System 208 (Ferrous Metal - Chemical Resistant Finish): NOT USED
- J. System 209 (Interior Concrete Masonry - Wet Areas): Apply to concrete masonry block units in kitchen, toilet rooms, bathrooms, janitor rooms, vestibules and other walls noted for enamel finish.
- 1. 1st Coat: Block Filler, w/o Aggregate. Provide Level 3 Full Fill.
 - 2. 2nd Coat: Primer/Sealer or same material as 3rd Coat as recommended by manufacturer.
 - 3. 3rd and 4th Coats: Enamel, Semi-Gloss - Solventborne or Enamel - Solventborne

(Epoxy-Polyester).

- K. System 210 (Interior Concrete Masonry or Plaster - Extremely Wet Areas): Apply to surfaces such as showers.
 - 1. 1st Coat: Block Filler, w/o Aggregate - Solventborne (Polyamide-Epoxy) Provide Level 3 Full Fill.
 - 2. 2nd and 3rd Coats: Enamel, Gloss - Solventborne (Polyamide-Epoxy).
- L. System 211 (Interior Concrete Masonry - Non-Wet Areas): Apply to exposed interior concrete masonry block units except areas specified above for enamel finish.
 - 1. 1st Coat: Block Filler, w/o Aggregate. Provide Level 1, 2 or 3 Fill as required by gloss.
 - 2. 2nd Coat: Same material as 3rd Coat as recommended by manufacturer.
 - 3. 3rd Coat: Enamel, Semi-Gloss - Waterborne.
- M. System 212 (Acoustic Ceilings): Apply to existing acoustic panel or tile ceilings.
 - 1. 1st and 2nd Coat: Acoustic Paint.

3.11 CLEAR WOOD FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 301 (Stained and Clear Finish): Apply to wood doors, handrails and chair rails. Fill open grain hardwood such as Oak.
 - 1. Stained and Finished with Clear Satin or Gloss Varnish - Solventborne:
 - a. 1st Coat: Semi-Transparent Stain - Solventborne (Oil)
 - b. 2nd Coat: Varnish, Gloss – Polyurethane (Solventborne)
 - c. 3rd Coat:
 - 1) Satin: Varnish, Satin – Polyurethane (Solventborne)
 - 2) Gloss: Varnish, Gloss – Polyurethane (Solventborne)
 - 2. Stained and Finished with Clear Satin or Gloss Varnish– Waterborne:
 - a. 1st Coat: Semi-Transparent Stain - Solventborne (Oil)
 - b. 2nd Coat: Varnish, Gloss – Polyurethane (Waterborne)
 - c. 3rd Coat:
 - 1) Satin: Varnish, Satin – Polyurethane (Waterborne)
 - 2) Gloss: Varnish, Gloss – Polyurethane (Waterborne)r

3.12 HIGH PERFORMANCE FINISH SYSTEMS

- A. General: Products included in the following high performance systems are not listed in the Schedule of Paint Products located at the end of this Section.
- B. System 401 (Exterior Steel): Apply to cleaned bare exterior steel or lightly rusted, but clean, exterior steel ornamentation, trellis and canopies indicated to be coated with a clear protective coating.
 - 1. Single Clear Coat Protective Gloss Finish: Ameron PSX 700 Engineered Siloxane clear coating applied in one or two coats at 5 to 7 mils DFT.
- C. System 402 (Exterior Steel): Apply one of the following to cleaned bare exterior steel ornamentation, trellis and canopies indicated to be coated with a clear protective coating.
 - 1. Single Clear Coat Protective Gloss Finish: Sherwin Williams Fast Clad DTM Urethane, Clear Base, B65T854/B65V850, applied in one or two coats at 5 to 7 mils DFT.
 - 2. Clear Protective Gloss Finish: XIM Products, Inc. 903 Super Clear #2132 water reducible 3 part acrylic polyurethane coating, including #2133 Activator and #2134 Reducer. Mix in strict accordance with manufacturer's directions and apply by

- brush or spray to thickness as recommended.
3. Clear Protective Gloss Finish: PPG Durethane DTM urethane mastic 95-3300, applied in one or two coats at 3.0 to 5.0 mils DFT per coat.
- D. System 403 (Exterior Steel): Apply to exterior steel ornamentation, trellis, and canopies indicated to be painted.
1. 1st Coat: Sherwin Williams DTM Acrylic Semi-Gloss, or Shercryl Semi-Gloss, or International PC Intercryl 520 Primer/Finish applied at 2.5 mils DFT or PPG Pitt-Tech Int/Ext Satin DTM Industrial Enamel 90-474 Series at 2.0 to 3.0 mils DFT.
 2. 2nd Coat: Sherwin Williams DTM Acrylic Semi-Gloss, or Shercryl Semi-Gloss or International PC Intercryl 530 Gloss applied at 4 to 5 mils DFT or PPG Pitt-Tech Int/Ext Satin DTM Industrial Enamel 90-474 Series at 2.0 to 3.0 mils DFT.
- E. System 403 (Exterior Steel): Apply to exterior structural steel, tanks, towers, pipes, etc. that are indicated to be painted.
1. Provide the following one coat system at inaccessible locations that do not require abrasion resistance such as overhead canopies and building ornamentation
 2. 1st Coat: Tnemec Series 18 at 3 mils DFT, or Sherwin Williams Procryl Universal Primer, B66W310, or International PC Intercryl 520 Primer/Finish at 3-4 mils DFT, or PPG Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel 90-712 Series at 2.0 to 3.0 mils DFT.
 3. 2nd Coat: Tnemec Series 30 Spra-Saf EN Hydrophobic Acrylic Polymer at 2 to 4 mils DFT, or Sherwin Williams Spraylastic Ext. S/G Dryfall, B42W17, spray applied only, or Sherwin Williams Acrylic or Shercryl Semi-Gloss or International PC Intercryl 530 Gloss applied at 4 to 5 mils DFT or PPG Pitt-Tech Int/Ext DTM Industrial Enamels Satin 90-474 Series at 2.0 to 3.0 mils DFT.

3.13 SCHEDULE OF PAINT PRODUCTS

- A. Only those products which are specifically required by this Section shall be provided. Products listed in the following Schedule that are not specified in this Section are for information only.

(continued)

EXTERIOR PRIMERS/UNDERCOATERS	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Red Ferrous Metal Primer	101							
Waterborne		BRPR00	561	4020	---	90-708	B66-310	18
Solventborne		---	661	4160	M06-20	7-858	B50NZ3	10-99
Galvanized Metal Primer	102							
Waterborne		UGPR00	561	4020	M04	90-712	B66-310	18
Solventborne		GAPR00	661	4160	---	6-209	B50WZ30	66
Vinyl Wash Pretreatment /Surface Conditioner	102, 103							
Waterborne		ME01	---	88	---	---	B71Y1	---
Solventborne		---	Jasco Prep n Prime	---	M115	97-687	N/A	---
Aluminum Metal Primer	103							
Waterborne		UGPR00	561	4020	023	90-712	B66-310	18
Solventborne		GAPR00	661	4160	M07	6-204	B50XZ30	66
White Ferrous Metal Primer	101							
Waterborne		BRPR00	561	4020	M04-01	90-712	B66-310	18
Solventborne		---	661	4160	M07-01	7-852	B50Z Series	10-99W
Concrete and Masonry Block Filler	104							
Waterborne (100% Acrylic)		SBPR00	---	4000	---	16-90	B42W46	54-580
Waterborne Vinyl Acrylic & Other		SBSL00	262	GP3010	---	6-7, 6-15	B25W25	130
Solventborne		---	Amerlock 400BF	---	M31/M32	95-217	B42W400/B42V401	54-660
Concrete and Masonry Primer	104-105							
Waterborne		ESPR00	266	GP3030	247	4-603, 4-100	A24W08300	151
Solventborne		---	---	---	---	---		66
Epoxy (2 component)		---	---	205	---	97 Series	B70W100/B60V15	84
Masonry Surface Conditioner								
Waterborne		---	266	GP3030	066	6-808	A24V00100	151
Solventborne		---	---	---	077	---		205
Exterior Gypsum Board Primer/Undercoater	107							
Waterborne		UGPR00	168	GP6001	023	6-609	B42W08041	6
Solventborne		---	---	GP2110	024	6-9	Y24W08020	36-603

(continued)

EXTERIOR PRIMERS/UNDERCOATERS (continued)	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Exterior Wood Primer								
Waterborne (100% acrylic)	106	EZPR00	168	GP6001	023	6-609	B42W08041	6
Solventborne		---		GP2110	094	6-9	Y24W08020	36-603
Multi-Purpose Primer								
Waterborne (100% acrylic)		UGPR00	168	GP3210	023	90 Series	B51W00450	18
Solventborne		GAPR00	---	4160	024	97-689	B50WZ1	37H
High Build Polyamide Epoxy Primer (2 Part)								
Waterborne		---	Amercoat 335	4030	M42	98 Series	B70W100/B60V15	462
Solventborne (ferrous metals)		Carboguard 890	Amerlock 400	233H	M33/34	97-DTR	B67-400 Series	66
Solventborne (galvanized metal)		Carboguard 890	Amerlock 400	201	M33/34	97-DTR	B67- 400 Series	66

EXTERIOR PAINT – FINISH COATS	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Paint, Flat (Gloss Rating 0-15 @ 85 degree gloss meter)								
Waterborne (Vinyl Acrylic)		SSHV10	206	GP2250	---	10-Series	C01W00251	---
Waterborne (100% Acrylic)	101 – 107	ACHS10	209/213	GP2200	N105	6-610	A-100 (A6 Series)	115
Paint, Eggshell								
Waterborne (100% Acrylic)		EVSH30	215	GP2402	N103	6-2045	A82W00151	--
Solventborne		---	---	---	163	---	---	15
Enamel, Low Luster								
Waterborne (100% Acrylic - Non-Blocking)		EVSH40	126	GP2402	N103	90-474	A75W00051	6
Solventborne		---	622	---	163	---		--
Enamel, Semi-Gloss								
Waterborne (100% Acrylic - Non-Blocking)	101 – 106	EVSH50	124	GP2406	N906	6-901	A76W00051	30
Solventborne		9 Series	628	4328	---	---	B54W00151	23
Solventborne (Industrial)		9 Series	628	---	M24	018 Pters	B54W00151	23
Solventborne (Acrylic Aliphatic)		Carbothane		378	M74S	95-8600	B65-630/B65V625	73
Polyurethane - 2 Component)		133HB				Series		

(continued)

EXTERIOR PAINT – FINISH COATS (continued)	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Enamel, Gloss Waterborne (100% Acrylic - Non-Blocking)	101 –106	EVSH60	143	GP3028	M28	90-374/6-8534	A77W00051	---
Solventborne (Quick Dry)		10 Series	648	4318	M20	7-800/ 95-9000 Series	B54W0151	---
Solventborne (Silicone)		42-53V	---	877	M21	97-480	B54W0151	---
Solventborne (Industrial)		10 Series	648	4328	M26	7-284	B54W0151	2H
Solventborne (Aliphatic Polyurethane - 2 Component)		---	Ameron Amersfield	379	M74/M75	97-800/95 Series	B65W625/B60V50	1074
Solventborne (Acrylic Aliphatic Polyurethane - 2 Component)		Carbothane 134 HG		389	M74/M75	97-800	B65W625/B60V50	1074
Elastomeric (Smooth) Waterborne (100% Acrylic)		Elastokote Premium	216	GP2260	056	4-310 Matte	A05W00451	156
Textured Coating, Smooth Waterborne (Vinyl Acrylic)		W320	204S	GP2260	---	4-series	A44W00801	180
Solventborne		---	---	---	---	---	---	---
Textured Coating, Medium Waterborne (Vinyl Acrylic)		W322	204M	GP3230	---	4-series	A44W00811	181
Solventborne		---	---	---	---	---	---	---
Textured Coating, Coarse Waterborne (Vinyl Acrylic)		W323	204C	GP3230	---	4-series	A44W00821	---
Floor Paint (Single or 2-component) Waterborne (Acrylic Epoxy)		Sanitile 555	---	4428	M24	98 Series	B90 Series Treadplex	287
Solventborne		Sanitile 945	Amerlock 400	GP3118	M36/M37	97 Series		280
Aluminum Paint Solventborne		---	628/648	4309	M22/78	6-230	B59S11	530
Aluminum Metal Waterborne		Rust-Oleum 5200 ALumi- Non	126/124/143	4020	---	90 Series	B71S200	---
Solventborne		---	622/628/648	---	M22/78	---	B59S11	1077

EXTERIOR STAIN	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Solid Color Stain Waterborne (100% Acrylic)		W704	209	2600	1240	77 Series (Olympic)	A15W00051	617
Solventborne (Oil)		---	---	2700	Cabot's 6500	Olympic		607
Semi-Transparent Toner Waterborne (Water Repellent)		ONC	Monopole Aquaseal Stain	---	---	77 Series (Olympic)		633
Solventborne (Oil)		---	385	---	---	Olympic	A18C50500	660
Semi-Transparent Stain Waterborne (Water Repellent)		WPT3	Monopole Aquaseal 2	---	---	77 Series (Olympic)	DeckScapes A15T00115	633
Waterborne		---	---	2610	1285	77 Series	Decksapes	617
Solventborne (Oil)	301	Messmer's UV Plus or Penofin	385	2710	Cabot's 6300	Olympic	A15T00115 A15T00005	607

EXTERIOR CLEAR FINISHES	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Spar Varnish, Gloss Waterborne		---	Flecto Diamond Finish	---	---	---	---	---
Solventborne		McClosky MC80-6509	McClosky 6509	---	McClosky Man-O-War	McClosky	Minwax Helmsmans	---
Aliphatic Polyurethane, Gloss (2 Part) Solventborne		---	Ameron Amersfield	379	Rust. 9700	95 Series		76
Exterior Gloss Varnish, Alkyd (Paleamber) Solventborne		---	---	---	---	---	Minwax Helmsmans	---

INTERIOR PRIMERS/UNDERCOATERS	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Red Ferrous Metal Primer	201							
Waterborne		BRPR00	561	4020	M04	90-708	B66-310	18
Solventborne		---	661	4160	M06-20	7-858	B50NZ3	10-99
White Ferrous Metal Primer	201							
Waterborne		BRPR00	561	4020	M04-01	90-712	B66-310	18
Solventborne		---	661	4160	M06-20	7-852	B50WZ30	10-99W
Galvanized Metal Primer	204							
Waterborne		UGPR00	561	4020	M04	90-712	B66-310	18
Solventborne		GAPR00	661	4160	---	6-209	B50WZ30	66
Aluminum Primer	205							
Waterborne		UGPR00	561	4020	M04	90-712	B66-310	18
Solventborne		GAPR00	661	4160	M06	6-204	B50WZ30	66
Primer/Sealer (for drywall, etc.)	206,207,209							
Waterborne (Vinyl Acrylic)		VNSL00	061	GP1030	216	6-4	B28W08601	51-792
Waterborne (Zero VOC)		VNSL00	066	GP9116	231	9-2	B28W02600	---
Solventborne (Alkyd)	(206,207)	COVER STAIN		GP1110	024	6-6		36-603
Vinyl Acrylic Wall Sealer								
Waterborne	211	VNSL00	061	GP1030	253	6-2, 17-21	B28W08601	51-792
Enamel Undercoater/Primer	201 - 203, 206							
Waterborne (100% Acrylic)		IKPR00	168	GP1020	253	6-855	B51W00020	18
Solventborne		---		GP1120	245	6-6		36-603
Block Filler, w/ Aggregate								
Waterborne		MBPR00	---	---	---	---		130
Solventborne		---	---	---	---	---	---	54-562
Block Filler, w/out Aggregate	209, 211							
Waterborne		SBSL00	262	GP3010	285	6-7	B25W25	54-580
Waterborne (100% Acrylic)		SBPR00	---	4000	M88	6-15, 16-90	B42W46	130
Solventborne (Polyamide-Epoxy)	210	---	Ameron 400 BF	---	M31/32	97-685/686	B42W400/B42V401	54-660
Epoxy Polyester Primer								
Waterborne		---	---	4030	---	---	B70W100/B601V15	462
Solventborne		GAPR00	661	---	M25	7-858	B58-600/B58V600	84

(continued)

INTERIOR PRIMERS/UNDERCOATERS (continued)	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Vinyl Wash Pretreatment/Surface Conditioner	204, 205							
Waterborne		ME01	---	88	---	---	B71Y1	---
Solventborne			Jasco Prep n prime	---	M15	97-687/688	B50WZ30	---
Concrete and Masonry Primer	211							
Waterborne		ESPR00	266	GP3030	068	4-100, 4-603	A24W08300	151
Solventborne		---	---	GP2110	077	---		84
Epoxy (Two Component)		---	Amerlock 400	235	---	97 Series		54-660

INTERIOR PAINT - FINISH COATS	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Acoustic Paint	212							
Waterborne (Vinyl-Acrylic)		W615	003	GP2110V	258	50 Series		180
Paint, Flat	207							
Waterborne (Vinyl Acrylic)	203	SWLL10	011	GP1210V	N215	6-70	B30W04651	180
Waterborne (Low Odor/Low VOC)		SWLL10	018	GP1410	219	9-110	B30W02651	115
Waterborne (Low Odor/Zero VOC)		SZRO10	018	GP9110	219	9-110	B30W02651	---
Solventborne		---	---	GP1310	306	---		15
Enamel, Low Sheen								
Waterborne (100% Acrylic)		SPMA30	126	GP1433V	221	---	B20W02651	6
Waterborne (Vinyl Acrylic)		SWLL30	125	GP1412	---	6-510	B20W04651	---
Waterborne (Low Odor/Zero VOC)		SZRO30	029	GP9100	223	9-510	B20W02651	---
Solventborne		---	622	GP1502	---	7-824		15
Enamel, Eggshell	201, 204, 205, 207							
Waterborne (100% Acrylic)		SPMA40	---	GP1403	N319	**6-411		---
Waterborne (Vinyl-Acrylic)		SWLL40	022	GP1412	---		B20W04651	---
Waterborne (Low Odor/Zero VOC)		SZRO30	029	GP9300	223	9-411	B20W02651	---
Waterborne (Non-Blocking - 100% Acrylic)	202	EVSH40	126	GP1403	---	**6-411	B75W00051	---
Solventborne	206	---	622	---	305	---		---

(**Not 100% Acrylic, but is their top of line product)

(continued)

INTERIOR PAINT – FINISH COATS (continued)	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Enamel, Semi-Gloss	201, 204, 205, 207							
Waterborne (100% Acrylic)		SPMA50	124	GP1416	333	6-8510	B31W02651	29
Waterborne (Non-Blocking - 100% Acrylic)	202, 211	EVSH50	124	GP1407	---	6-8510	B76W00051	---
Waterborne (Low Odor/Low VOC)		SWLL50	032	GP1456	224	9-510	B31W02651	29
Waterborne (Low Odor/Zero VOC)		SZRO50	032	GP9200	224	9-510	B31W02651	---
Waterborne (2 Component Epoxy)		Sanitile 255	Amercoat 335	4426	M42S	98 Series	B70-200/B60V25	113
Solventborne	206, 209	---	628	4309	207	---	B54Z	23
Solventborne (Industrial)		9 Series	628	4309	M24	7-844	B54Z	23
Solventborne (Epoxy-Polyester)		---	Amerlock 2	235	---	16-Series	B58-600	66
Enamel, Gloss	201, 204, 205							
Waterborne (Non-Blocking - 100% Acrylic)	202	EVSH60	143	GP3028	M28, 309	90-375	B21W00251 A77W00051	---
Waterborne (2 Component Epoxy)		Sanitile 555	Amercoat 335	4408 Low-VOC GP3038	M42	98 Series	B73-100	114
Waterborne (Low Odor/Low VOC)		---	143	---	---	---	---A77W00051	28
Solventborne		10 Series	648	4309	M22	7-800/ 95-9000 Series	B54Z	2H
Solventborne (Quick Dry)		10 Series	648	4318	M20	95- Series	B54Z	---
Solventborne (Industrial)	206	10 Series	648	4328	M26	7-812 Series	B54Z	2H
Solventborne (2-Component Epoxy)	209	Carboguard 890	---	224	M36/M37	97 Series	B62Z100/B6VZ70	135
Solventborne (Polyamide-Epoxy)	210	Carboguard 890	---	4508	M36/M37	97 Series	B62Z- 100/B60VZ70	84
Floor Paint (Single or 2-component) Waterborne(Epoxy-Acrylic)		Sanitile 555	Amercoat 335	4428	M42	98 Series	B90 Series Treadplex	287
Solventborne		Sanitile 945	Amerlock 400	GP3118	122	7 Series	B62Z Series	280

INTERIOR STAIN	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Semi-Transparent Stain								
Waterborne (Water Repellent)		OKON Weather Pro	Monopole Aquaseal 2	1700V	---	77 Series (Olympic)	---	633
Waterborne			---	1700V	---	77 Series (Olympic)	Minwax	617
Lacquer-Based Stain								
Waterborne	---	---	---	---	---	---	---	---
Pigmented Solid Color Stain								
Waterborne (100% Acrylic)		ACH510	209	---	089	77 Series (Olympic)	---	617
Semi-Transparent Toner								
Waterborne (Water Repellent)		OKON Natural Colors	Aquaseal 2	1700V	---	77 Series (Olympic)	---	633

INTERIOR CLEAR FINISHES	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Resin Sealer								
Waterborne		---	McClosky 6200	1808	---	---	---	462
Sanding Sealer								
Waterborne (Acrylic Urethane)		---	Flecto	1916V	---	---	---	---

(continued)

INTERIOR CLEAR FINISHES (continued)	System(s)	Dunn-Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Varnish, Flat								
Varnish, Satin (Low Sheen) Waterborne (Acrylic Urethane)	301	Cabot 8082	Flecto Varathane	1802	423	77-49	A68F00090	---
Varnish, Semi-Gloss Waterborne (Acrylic Urethane) Waterborne (Acrylic)	--- ---	Cabot 8087 ---	--- Flecto	Agua Zar ---	--- ---	--- ---	Polycrylic S/G Polycrylic S/G	--- ---
Varnish, Gloss Waterborne (Acrylic Urethane)	301	Cabot 8080	Flecto	1808	422	77-45	A68V00091	---

INTERIOR CLEAR FINISHES (continued)	System(s)	Dunn- Edwards	Frazee	Glidden (ICI)	Benjamin Moore	PPG	Sherwin Williams	Tnemec
Lacquer, Flat Waterborne		Zenith LKF7001	520H 038	---	---	---	T75F528	---
Lacquer, Semi-Gloss Waterborne	301	Zenith LKF7006	520H042	---	---	---	T75F526	---
Lacquer, Gloss Waterborne		Zenith LKC7009	540H034	---	---	---	T75C525	---
Lacquer, Crystal Clear Sanding Sealer Waterborne		---	560H032	---	---	---	T65F520	---
Lacquer, Non-Yellowing, Flat Waterborne		Zenith LKF7001	520H038	---	---	---	T75F528	---
Lacquer, Non-Yellowing, Semi-Gloss Waterborne		Zenith LKF7006	520H042	---	---	---	T75F526	---
Lacquer, Non-Yellowing, Gloss Waterborne		Zenith LKC7009	540H03X	---	---	---	T75C525	---

END OF SECTION

SECTION 099653
ELASTOMERIC COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and application of elastomeric coatings to the following exterior substrates:
 - 1. Concrete.
 - 2. Concrete unit masonry.
 - 3. Stucco.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of elastomeric coating.
- C. Samples for Verification: For each type of elastomeric coating indicated, and for each color and gloss.
 - 1. Submit Samples on same type of substrate as that to receive application, **8 inches** square.
 - 2. Apply coats on Samples in steps to show each separate coat, including primers and block fillers as applicable.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent but not less than **1 gal.** of each material, color, and texture applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least **100 sq. ft.**
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F.**
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between **50 and 90 deg F** unless otherwise permitted by manufacturer's written instructions.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than **5 deg F** above the dew point; or to damp or wet surfaces.
- C. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace elastomeric coatings that fail within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Water penetration through the coating.
 - b. Deterioration of coating beyond normal weathering.
 2. Warranty Period: 10 years from date of Substantial Completion.
 3. Manufacturer of material shall provide a 10 year waterproofing warranty for elastomeric coating as long as the substrate, application and removal methods meet their guidelines per data page. Rilem tube testing to be conducted at Owner or Architect's request.
 4. The painting contractor is required to make a site visit with the manufacturer's representative **PRIOR** to beginning any work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide [Sherwin-Williams Company \(The\)](#); products as designated in Part 3.6, the Elastomeric Coating Schedule, or a comparable product by one of the following:
1. Benjamin Moore & Co.
 2. Dunn-Edwards
 3. PPG Paints.
 4. Sto Corp.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in the Elastomeric Coating Schedule for the paint category indicated.

2.2 MATERIALS

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Moisture-Vapor Transmission: Minimum 34 perms, based on testing in accordance with ASTM D1653.
- C. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- D. Colors: As selected by Architect from manufacturer's full range.
- E. Crack Fillers: Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated.
- F. Primer: Elastomeric coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and other materials indicated.
- G. Concrete Unit Masonry Block Filler: Elastomeric coating manufacturer's recommended, factory-formulated, high-performance latex block filler compatible with substrate and other materials indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and other conditions affecting performance of work.
- B. Begin coating only when moisture content of substrate is 12 percent or less when measured with an electronic moisture meter.
- C. Begin coating no sooner than 28 days after substrate is constructed and is visually dry on both sides.
- D. Verify that substrate is within the range of alkalinity recommended by manufacturer.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in the "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
 - 2. Perform cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- D. Crack Repair: Fill cracks in accordance with manufacturer's written instructions before coating surfaces.

3.3 APPLICATION

- A. Apply elastomeric coatings in accordance with manufacturer's written instructions.
 - 1. Use equipment and techniques best suited for substrate and type of material being applied.
 - 2. Coat surfaces behind movable items the same as similar exposed surfaces.
 - 3. Apply each coat separately in accordance with manufacturer's written instructions.
- B. Primers: Apply at a rate to ensure complete coverage.
- C. Block Fillers: Apply at a rate to ensure complete coverage with pores filled.
- D. Elastomeric Finish Coat(s): Minimum two coats with a total dry film thickness of **12 to 15 mils** with less than 10 pin holes per sq. ft.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats similar to color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- F. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform finish, color, and appearance.
- G. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- H. Apply coatings to prepared surfaces as soon as practicable after preparation and before subsequent surface soiling or deterioration.
- I. Spray Application: Use spray equipment for application only when permitted by authorities having jurisdiction. Wherever spray application is used, do not double back with spray equipment to build up film thickness of two coats in one pass.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following testing procedures:
1. Owner will engage the services of a qualified testing agency to sample materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will perform tests for compliance of materials with product requirements.
 3. Owner may direct Contractor to stop coating application if test results show materials being used do not comply with requirements. Remove noncomplying materials from Project site, pay for testing, and recoat surfaces that were coated with rejected materials. Remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.
- B. Field Testing and Inspection: Owner reserves the right to engage the services of a qualified testing agency to verify installed thickness of elastomeric coatings.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities, touch up and restore damaged or defaced coated surfaces.

3.6 ELASTOMERIC COATING SCHEDULE

- A. Concrete Substrates:
1. Elastomeric Coating System:
 - a. Prime Coat: S-W Loxon Concrete & Masonry Primer Sealer, LX02W0050 (8 mils wet, 3.2 mils dry).
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: S-W ConFlex XL Elastomeric High Build Coating, CF11-0050 Series (Total DFT of 12-15 mils of topcoat and a surface with 10 or less pinholes per square foot).
- B. Concrete Unit Masonry Substrates:

1. Elastomeric Coating System:
 - a. Block Filler: S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (8.0-10.5 dry mils). *Do not apply over existing coatings per manufacturer data page.*
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: S-W ConFlex XL Elastomeric High Build Coating, CF11-0050 Series (Total DFT of 12-15 mils of topcoat and a surface with 10 or less pinholes per square foot).

C. Stucco Substrates:

1. Elastomeric Coating System:
 - a. Prime Coat: S-W Loxon Concrete & Masonry Primer Sealer, LX02W0050 (8 mils wet, 3.2 mils dry).
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: S-W ConFlex XL Elastomeric High Build Coating, CF11-0050 Series (Total DFT of 12-15 mils of topcoat and a surface with 10 or less pinholes per square foot).

END OF SECTION 09 96 53

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SECTION 10 14 23.16

ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes room-identification signs that are directly attached to the building.
- B. Related Requirements:
 - 1. Section 10 14 16 "Plaques" for one-piece, solid metal signs, with or without frames, that are used for high-end room-identification.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For room-identification signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements , including raised characters and Braille, and layout for each sign .
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" the ABA standards of the Federal agency having jurisdiction and ICC A117.1 .

2.2 ROOM-IDENTIFICATION SIGNS

- A. Room-Identification Sign : Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. ACE Sign Systems, Inc.
 - b. APCO Graphics, Inc.
 - c. ASI Sign Systems, Inc.
 - d. Best Sign Systems, Inc.
 - e. Inpro Corporation.
 - f. Mohawk Sign Systems.
 - g. Seton Identification Products; a Brady Corporation company.
 2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign **0.125 inch** .
 - b. Surface-Applied Graphics: Applied vinyl film .
 - c. Color(s): As selected by Architect from manufacturer's full range .
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition : As indicated on Drawings .
 - b. Corner Condition in Elevation: As indicated on Drawings .
 4. Frame: to hold changeable sign panel .
 - a. Material: Aluminum .
 - b. Profile: Square .
 - c. Corner Condition in Elevation: Mitered .
 - d. Finish and Color: As selected by Architect from manufacturer's full range .
 5. Mounting: Manufacturer's standard method for substrates indicated with concealed anchors adhesive two-face tape .
 6. **Locations:** **Provide a sign for each building door.**

2.3 SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

- B. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
- B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 2. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 - 3. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- C. Subsurface-Etched Graphics: Reverse etch back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.

3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
3. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
4. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

END OF SECTION 10 14 23.16

SECTION 10 21 13

PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Solid plastic toilet compartments and urinal screens as shown on Drawings and as specified of the following type:
 - 1. Compartment Style: Floor mounted, overhead (headrail) braced.
 - 2. Screen Style: Wall mounted.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings showing plans, elevations, details of construction, finish color, hardware fittings and fastenings. Indicate locations of blocking or materials by others as necessary for proper fastening of units to wall construction.
- B. Samples: Submit four (4) samples of Manufacturer's standard colors and hardware for selection and approval by Architect.

1.03 PERFORMANCE REQUIREMENTS

- A. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
 - 1. Smoke Developed Index: Not to exceed 450
 - 2. Flame Spread Index: Not to exceed 75
 - 3. Material Fire Ratings:
 - a. National Fire Protection Association (NFPA): Class B
 - b. International Code Council (ICC): Class B

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the following:
 - 1. ANSI A117.1, 2009 "Accessible and Usable Buildings and Facilities."
 - 2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
 - 3. 2010 ADA Accessibility Guidelines (ADAAG).
 - 4. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG)
- B. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- C. Installer's Qualifications: A Company or Individual, regularly engaged in installation of products specified in this Section, with a minimum of 5 years of experience.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.
- B. Storage: Adequately protect against damage while stored at the site.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

1.07 WARRANTY

- A. Provide manufacturer's standard material warranty covering plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of the following Manufacturers, except as otherwise approved by the Architect, subject to compliance with Specification requirements.
 - 1. Accurate Partitions Corp. www.accuratepartitions.com
 - 2. Accu Tec Mfg. www.accutecmfg.com
 - 3. Global Partitions www.globalpartitions.com
 - 4. Hadrian www.hadrian-inc.com/HomePage.aspx
 - 5. Metpar Corp. www.metpar.com
 - 6. Scranton Products www.scrantonproducts.com
- B. Basis of Design: Drawings and Specifications are based on products as manufactured by Hadrian.

2.02 MATERIALS

- A. Doors, panels and pilasters shall be 1 inch thick constructed from High Density Polyethylene (HDPE) or Polypropylene (PP) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.
 - 1. Homogenous color and pattern as selected by Architect from Manufacturer's full range of standard colors.
 - 2. Color and Pattern: Black.

2.03 CONSTRUCTION

- A. Doors, panels, and pilasters shall be 1 inch thick with all edges rounded to a radius.
- B. Dividing panels shall be floor to ceiling height.
- C. Door may be 7'-0" tall with a panel above, but must sweep the floor.
- D. Pilasters: from floor to ceiling.

2.04 HARDWARE

- A. Door hardware shall be as noted:
 - 1. Hinges shall be 8 inches and fabricated from heavy-duty extruded aluminum (6463-T5 alloy) with bright dip anodized finish with wrap-around flanges, through bolted to doors and pilasters with stainless steel, torx head sex bolts. Hinges operate with field adjustable nylon cams. Cams can be field set in 30-degree increments.
 - 2. Door strike/keeper shall be 6 inches long and made of heavy-duty extruded aluminum (6436-T5 alloy) with a bright dip anodized finish and secured to the pilasters with stainless steel tamper resistant torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - 3. Latch and housing shall be made of heavy-duty extruded aluminum (6463-T5 alloy). The latch housing shall have a bright dip anodized finish, and the slide bolt and button shall have a black anodized finish.
 - 4. Each door shall be supplied with one coat hook/bumper and door pull made of chrome plated zamak. Handicapped doors shall be supplied with a second door pull and out swing doors with one door stop made of chrome plated zamak.
- B. Pilaster shoes shall be 3 inches high and made of stainless steel.
 - 1. Pilaster shoes shall be secured to the pilaster with a stainless steel tamper resistant torx head sex bolt.
- C. Wall Brackets: Full-height (continuous) Type, manufacturer's standard, stainless steel.
 - 1. Stirrup brackets shall be fastened to pilasters and panels with stainless steel tamper resistant torx head sex bolts.
- D. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.
- E. Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design and integrated curtain track.
 - 1. Finish: Clear anodized.
 - 2. Headrail shall be fastened to the headrail bracket by a stainless steel tamper resistant torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant torx head screws.
- F. Headrail brackets shall be 20 gauge stainless steel with a satin finish and secured to the wall with a stainless steel tamper resistant torx head screws.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A. Install toilet partitions in strict accordance with Manufacturer's printed instructions, at locations indicated. Erect straight and plumb, with horizontal lines level.
- B. All doors and panels shall be mounted 14 inches above the finished floor.
- C. Overhead Bracing: Fasten headrail to tops of pilasters and headrail brackets by thru-bolting with one-way stainless steel sex bolts. Cadmium plated sex bolts shall not be allowed.
- D. Clearances
 - 1 Clearance at vertical edges of doors shall be uniform top and bottom and shall not exceed 1/2 inch.
 - 2 Provide clearance at the wall of approximately 1 inch or less for panels and 1 inch or less for pilasters. Conceal evidence of drilling, cutting and fitting to room finish in the finish Work.
- E. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

3.03 FIELD QUALITY CONTROL

- A. Adjust hardware for satisfactory operation. Adjust door hinges to hold door open at approximately 30 degrees. Upon completion of the installation, put each operating component through at least ten operating cycles. Adjust to achieve optimum operation.
- B. Upon completion of the installation, visually check exposed surfaces, and touch up scratches and abrasives to be completely invisible to the unaided eye from a distance of five feet.

3.04 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.
- B. Manufacturer's representative shall meet with Owner's maintenance personnel at project closeout to provide training regarding proper care and handling of maintenance of plastic toilet partitions.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Hand dryers.
4. Childcare accessories.
5. Underlavatory guards.
6. Custodial accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each finish specified, full size.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Delegated Design Submittal: For grab bars and shower seats.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. 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.
- B. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist **250 lbf** concentrated load applied in any direction and at any point.
 - 2. Shower Seats: Installed units are able to resist **360 lbf** applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Toilet Tissue (Roll) Dispenser :
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - 2. Description: Double-roll dispenser .
 - 3. Mounting: Partition mounted, serving two adjacent toilet compartments or Surface mounted.
 - 4. Operation: Eccentric-shaped, molded-plastic spindle revolves one-half revolution per dispensing operation for controlled delivery; core cannot be removed until roll is empty .
 - 5. Capacity: Designed for **4-1/2- or 5-inch-** diameter tissue rolls.
 - 6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
- B. Paper Towel (Folded) Dispenser :
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.

- d. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Semirecessed .
3. Minimum Capacity: 400 C-fold or 525 multifold towels .
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
5. Lockset: Tumbler type.
6. Refill Indicator: Pierced slots at sides or front.

C. Paper Towel (Roll) Dispenser :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Lever-actuated mechanism permitting controlled delivery of paper rolls in preset lengths.
3. Mounting: Semirecessed .
4. Minimum Capacity: **8-inch-** wide, **800-foot-** long roll .
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
6. Lockset: Tumbler type.

D. Automatic Paper Towel (Roll) Dispenser :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Automatic motion sensing mechanism with user-adjustable delay and paper towel length; electrically operated, with adapter for 110- to 240-V ac power supply .
3. Mounting: Semirecessed .
4. Minimum Capacity: **8-inch-** wide, **800-foot-** long roll .
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
6. Lockset: Tumbler type.

E. Waste Receptacle :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Open top, recessed Semirecessed Freestanding Undercounter .
3. Minimum Capacity: **12 gal.**
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
5. Liner: Reusable vinyl liner .
6. Lockset: Tumbler type for waste receptacle.

F. Combination Towel (Folded) Dispenser/Waste Receptacle :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
3. Mounting: Recessed with projecting receptacle Semirecessed .
 - a. Designed for nominal **4-inch** wall depth.
4. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels .
5. Minimum Waste-Receptacle Capacity: 12 gal. min. .
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
7. Liner: Reusable, vinyl waste-receptacle liner .
8. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle.

G. Combination Towel (Roll) Dispenser/Waste Receptacle :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Combination unit for dispensing preset length of roll paper towels, with removable waste receptacle.
3. Towel Mechanism: Lever Pull towel . Automatic, electric sensor; with adapter for 110- to 240-V ac power supply .
4. Mounting: Semirecessed .
5. Minimum Towel-Dispenser Capacity: **8-inch-** wide, **800-foot-** long roll .
6. Minimum Waste Receptacle Capacity: **12 gal.** .
7. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
8. Liner: Reusable, vinyl waste-receptacle liner .
9. Lockset: Tumbler type for towel dispenser compartment and waste receptacle.

H. Soap Dispenser :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Designed for manual operation and dispensing soap in liquid or lotion lather form.
3. Mounting: Vertically oriented, surface mounted .
4. Capacity: **40 fl oz (1/2 L).**
5. Materials: **Stainless steel, ASTM A480/A480M No. 4 finish (satin).**
6. Lockset: Tumbler type.

7. Refill Indicator: Window type.

I. Automatic Soap Dispenser :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bradley Corporation.
 - c. GAMCO Specialty Accessories; a division of Bobrick.
 - d. Sloan Valve Company.
2. Description: Automatic dispenser with infrared sensor to detect presence of hands; battery powered; designed for dispensing soap in liquid or lotion lather form.
3. Mounting: Surface mounted.
4. Capacity: **40 fl oz (1/2 L)**..
5. Materials: **Stainless steel, ASTM A480/A480M No. 4 finish (satin)**..
6. Refill Indicator: LED indicator.
7. Low-Battery Indicator: LED indicator.

J. Grab Bar :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, **0.05 inch** thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: **1-1/2 inches**.
5. Configuration and Length: As indicated on Drawings .

K. Sanitary-Napkin Disposal Unit :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Partition mounted, dual accessorSurface mounted.
3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .

L. Seat-Cover Dispenser :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Mounting: Surface mounted .
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
5. Lockset: Tumbler type.

M. Mirror Unit :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Frame: Stainless steel angle, **0.05 inch** thick .
 - a. Corners: Welded and ground smooth.
3. Size: **As indicated on Drawings (min. 24 x 30 inches)** .
4. Hangers: Manufacturer's standard rigid, tamper and theft resistant .

N. Hook :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Combination door bumper and coat hook .
3. Mounting: Concealed .
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .

O. Fixed Height Adult Changing Station :

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
 - a. Foundations Worldwide, Inc.
2. Description: Horizontal unit that opens by folding down from stored position and with adjustable strap.
 - a. Engineered to support minimum of **400-lb** static load when opened.
3. Mounting: Surface mounted, with unit projecting not more than **4 inches** from wall when closed .
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin), with replaceable insulated polystyrene tray liner and rounded plastic corners .
6. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

P. Adjustable Height Adult Changing Station :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Foundations Worldwide, Inc.
 - b. Pressalit Care Inc.
 - c. Smirthwaite USA LLC.
2. Description: Height adjustable horizontal unit electrically operated with wired hand control and with safety rail .
 - a. Engineered to support minimum of static load when opened.
3. Mounting: Surface mounted, foldable by pneumatic shock-absorbing mechanism.
4. Electrical Characteristics: Manufacturer's standard actuator and control system, with integrated 24-V dc transformer, powered by a single 120-V electrical receptacle.
5. Material and Finish: Manufacturer's standard.

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Shower Curtain Rod :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: **1-1/4-inch-** outside diameter, straight rod.
3. Configuration: As indicated on Drawings
4. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
5. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .

B. Shower Curtain :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Size: Minimum **12 inches** wider than opening by **72 inches** high.
3. Material: Nylon-reinforced vinyl, minimum **9 oz.** or **0.008-inch-** thick vinyl, with integral antibacterial and flame-retardant agents .
4. Color: White or As selected from manufacturer's full range .
5. Grommets: Corrosion resistant at minimum **6 inches** o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless steel, spring wire curtain hooks with snap fasteners , sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

C. Folding Shower Seat :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Configuration: **L-shaped seat**, designed for wheelchair access .
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect .
4. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
5. Dimensions: **33 x 20 inches** .

D. Soap Dish :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Recessed mounted, with the following features:
 - a. Washcloth bar.
3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .

E. Robe Hook :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Single-prong unit.
3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .

2.4 HAND DRYERS

A. High-Speed Air Dryer :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. Dyson Inc.
 - e. Excel Dryer Inc.
 - f. GAMCO Specialty Accessories; a division of Bobrick.
 - g. Sloan Valve Company.
 - h. World Dryer Corporation.
2. Description: High-speed, unheated-air hand dryer for rapid hand drying.

3. Mounting: Surface mounted.
 - a. Protrusion Limit: Installed unit protrudes maximum **4 inches** from wall surface.
4. Operation: Infrared-sensor activated with timed power cut-off switch.
 - a. Average Dry Time: **12 seconds**.
 - b. Automatic Shut Off: At 60 seconds.
5. Maximum Sound Level: **69 dB**.
6. Cover Material and Finish: Steel, with white enamel finish or Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
7. Electrical Requirements: 115 V, 15 A, 1725 W 208 to 240 V, 9 to 10 A, 1900 to 2300 W .

2.5 CHILDCARE ACCESSORIES

A. Diaper-Changing Station :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bradley Corporation.
 - c. GAMCO Specialty Accessories; a division of Bobrick.
 - d. Koala Kare Products; a Division of Bobrick.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of **250-lb** static load when opened.
3. Mounting: Surface mounted, with unit projecting not more than **4 inches** from wall when closed .
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: HDPE in manufacturer's standard color .
6. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

2.6 UNDERLAVATORY GUARDS

A. Underlavatory Guard :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Buckaroos, Inc.
 - b. Plumberex Specialty Products, Inc.
 - c. Truebro by IPS Corporation.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.7 CUSTODIAL ACCESSORIES

A. Custodial Mop and Broom Holder :

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. American Specialties, Inc. (ASI).
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf .
3. Length: **36 inches** .
4. Hooks: Three .
5. Mop/Broom Holders: Four , spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 - a. Shelf: Not less than nominal **0.05-inch**- thick stainless steel.
 - b. Rod: Approximately **1/4-inch**- diameter stainless steel.

2.8 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

END OF SECTION 10 28 00

SECTION 10 44 13
FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for portable fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fire-protection cabinets.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes, locations, and fire-protection of cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

- a. Activar Construction Products Group, Inc. - JL Industries.

- b. Babcock-Davis.
 - c. Guardian Fire Equipment, Inc.
 - d. Larsens Manufacturing Company.
 - e. Potter Roemer LLC; a Division of Morris Group International.
- B. Cabinet Construction: Nonrated, One-hour fire rated, Two-hour fire rated (to match rating of partition).
1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from **0.043-inch-** thick cold-rolled steel sheet lined with minimum **5/8-inch-** thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet Stainless steel sheet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
1. Rolled-Edge Trim: **2-1/2-inch** backbend depth.
- E. Cabinet Trim Material: Steel sheet Stainless steel sheet Same material and finish as door.
- F. Door Material: Steel sheet Stainless steel sheet .
- G. Door Style: **Fully glazed panel with frame (solid door at Gym Locations).**
- H. Door Glazing: Acrylic sheet .
1. Clear transparent acrylic sheet.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
1. **Larsen-Loc or equivalent.**
- J. Accessories:
1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated .
 - a. Identify fire extinguisher in fire-protection cabinet with the words " FIRE EXTINGUISHER ."
 - 1) Location: Applied to cabinet glazing .
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red .
 - 4) Orientation: Vertical .
- K. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Color: As selected by Architect from manufacturer's full range .
2. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
 - a. Finish: ASTM A480/A480M No. 4 directional satin finish, .
3. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, .
4. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished) .

2.3 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.
- B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Identification: Apply decals vinyl lettering at locations indicated.
- E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION 10 44 13

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SECTION 10 44 16
FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. Activar Construction Products Group, Inc. - JL Industries.
 - b. Guardian Fire Equipment, Inc.
 - c. Larsens Manufacturing Company.
 - d. Potter Roemer LLC; a Division of Morris Group International.
 - 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B , and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type : UL-rated **3A-40B:C, 6 lbs.** nominal capacity with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.
- C. Wet Chemical Type (at Kitchens): UL-rated **2A:K, 2.5 gal.** nominal capacity, with meeting K class listing for kitchens.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 10 44 16

SECTION 12 21 00

BLINDS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: [Horizontal](#) Blinds as shown on the Drawings and as specified.

1.02 SUBMITTALS

- A. Samples: Submit samples of blind materials, colors and patterns.
- B. Certification: Submit Manufacturer's certification for flammability of vertical blind vanes.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B. Storage and Protection: Adequately protect against damage while stored at the site.
- C. Handling: Comply with Manufacturer's instructions.

1.04 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following Manufacturers, except as otherwise specified approved by the Architect, subject to compliance with Specification requirements:
 - 1. Levolor Corporation www.levolor.com
 - 2. Hunter Douglas Inc. www.hunterdouglas.com
 - 3. Carey-McFall Corporation (Bali), Div. Springs Industries
 - 4. SWF Contract www.swfcontract.com

2.02 HORIZONTAL MINI-BLINDS

- A. Levolor Riviera Contract, or as approved.
 - 1. Slats: 5000 Series magnesium aluminum alloy only, not to include reprocessed metals. Nominally 1.00 inches plus or minus .003 inch wide, and .0075 inch plus or minus .0003 inch thick (prior to coating); after coating, the thickness of the slats shall be nominally .0085 inch. Slats shall be unperforated.
 - 2. Headrail: .025 inch thick Tomized steel, "U" shaped, 1 inch high x 1-9/16 inches wide. Enclose hardware in metal headrail.
 - 3. Valance: Provide matching 1 inch slat valance with clips for attachment to headrail.

4. Tilter Mechanism: .042 inch thick Tomized steel housing with a self-lubricating nylon, automatically disengaging worm and gear mechanism to eliminate overdrive.
 - a. Location: [No preference, or as selected by Architect.](#)
5. Tilt Wands: Transparent with a hexagonal cross section 5/16 inch across flats.
6. Cord Lock: .042 inch thick Tomized steel and shall be crash proof.
7. Drum and Cradle: Provide for each ladder.
 - a. Drums: .031 inch thick Tomized steel.
 - b. Cradles: .042 inch thick Tomized steel.
8. Brackets: Minimum .048 inch thick Tomized steel with a rivet-hinged safety locking front cover to permit removal of headrail without lateral movement.
9. Ladders (slat supports): Distance between slats shall not exceed 14.2 slats per vertical foot.
10. Bottom rail: .025 inch thick Tomized steel.
11. Color: [As selected by Architect from manufacturer's full range of available colors.](#)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination with other Work: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A. Install window blinds in strict accordance with Manufacturer's instructions. Install straight and plumb, securely fastened, and with horizontal lines level and true with window framing.
- B. Evidence of drilling, cutting and fitting to room finish shall be concealed in the finish work. Provide uniform clearance at edges not to exceed 3/16 inch. Adjust hardware for smooth operation.
- C. Install blinds between vertical window mullions with discontinuous head channel and slats, allowing independent blind operation for separate glazing units.

3.03 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 31 31 00

SOIL TREATMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pretreatment to provide chemical barrier to protect buildings and contents against attack by subterranean termites.
2. Treatment of site and areas as indicated to remove vegetation growth.

1.02 SUBMITTALS

A. Product Data: Submit label indicating Manufacturer's chemical analysis of treatment materials prior to application. Submit evidence of EPA approval and State registration.

B. Test Reports: Submit reports of field tests for termite treatment.

1.03 QUALITY ASSURANCE

A. Applicator Qualifications: Registered applicator with 5 years experience and licensed by the applicable agency in the state where the project is located.

B. Regulatory Requirements: Chemicals shall be approved for use and registered by Environmental Protection Agency (EPA) and the applicable agency in the state where the project is located.

1.04 DELIVERY, STORAGE AND HANDLING

A. Conform to Manufacturer's instructions and Governmental Agencies' requirements.

B. Deliver materials to Project in original sealed and labeled containers of Manufacturer.

1.05 SITE CONDITIONS

A. Do not apply chemicals in inclement weather or when there is a possibility of rain.

1.06 WARRANTY

A. Upon completion of soil treatment, and as a condition of final acceptance, provide Owner with written unlimited warranty providing:

1. Application was made at concentration, rate, and method in compliance with Specifications contained herein.
2. Warrants effectiveness of the soil treatment against subterranean termite infestation for a period of not less than 5 years from acceptance and completion date of Project.
3. Warrants effectiveness of soil treatment against vegetation growth for a period of six (6) months.

- B. Upon evidence of subterranean termite activity within warranty period, re-treat area to stop infestation of affected areas and repair termite caused damage to building at no cost to Owner.
 - 1. Re-treatment under warranty sufficient to prevent termites from attacking building or its contents during remainder of initial warranty period, plus one additional year for each time re-treatment under warranty is required.
 - 2. Complete re-treatment of the building shall be as specified herein and shall be rendered upon the third recurrence of subterranean termites in the same structure within 5-year period from the date of project acceptance.
 - 3. Damage caused by infestations and by re-treatment shall be repaired at no cost to the Owner.
- C. Upon evidence of vegetation growth re-treat area at no cost to Owner.
- D. Draft warranty in favor of Owner, successors or assigns.
 - 1. Pre-printed FHA or VA guarantee forms shall not be acceptable.
 - 2. The Owner and the applicator reserve the option to renew termite protection on an annual basis after the expiration of the warranty.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Termite Treatment: Apply one of the following chemicals as a water emulsion (no oil solutions permitted):
 - 1. Dragnet SFR (Permethrin), FMC Corporation www.fmc.com
 - 2. Prelude (Permethrin); Syngenta www.syngentaprofessionalproducts.com
 - 3. Prevail FT (Cypermethrin); FMC Corporation www.fmc.com
 - 4. Talstar (Bifenthrin), FMC Corporation. www.fmc.com
 - 5. Premise (Imidacloprid); Bayer Environmental Science www.bayerprocentral.com , www.nobugs.com
 - 6. Demon TC or Demon Max (Cypermethrin) Syngenta www.syngentaprofessionalproducts.com
 - 7. Termidor (Fipronil), Termidor Termite Control; BASF - www.termidorhome.com.
- B. Vegetation Treatment:
 - 1. Pre-Emergent:
 - a. Oryzalin (Surflan).
 - 2. Post-Emergent:
 - a. Roundup; Monsanto www.roundup.com
 - b. Season Long or Ground Clear; ORTHO www.ortho.com
 - c. SeasonPlus Grass and Weed Killer Plus Preventer; Spectracide www.spectracide.com
- C. Mix solutions in accordance with Manufacturer's directions to highest concentration allowable by label.

PART 3 EXECUTION

3.01 APPLICATION - TERMITE CONTROL

- A. Date and time of Application:
 - 1. Notify Architect, Owner and adjacent building occupants at least one week in advance of application. Do not proceed until all parties have verified and approved proposed date and time of application.
 - 2. Apply chemical treatment during normal working hours in order to be subject to observation.
 - 3. Do not treat soil and fill areas that are excessively wet or after heavy rains to avoid surface flow of toxicants.
- B. Application: In accordance with Manufacturer's recommendations, and local codes and regulations.
 - 1. Provide applicator trucks with approved measuring flow meters.
 - 2. Apply chemicals on soils and compacted ABC fill materials under entire subsurfaces of concrete floor slabs and slabs abutting building walls in quantities and locations stated on label.
- C. Do not disturb aggregate base course and treated soil between application of poison and pouring of concrete.
 - 1. Re-treat soil or compacted fill which has been disturbed after soil poisoning, due to plumbing and electrical changes or omissions.
 - 2. Should rainy weather occur prior to pouring concrete slab over treated ABC, re-treat the complete area at the discretion of Architect, and at no additional cost to Owner.

3.02 APPLICATION - VEGETATION CONTROL

- A. Apply chemical to on-site landscape areas and landscaped portions of public street right-of-ways of site.
- B. Chemical Control: Prior to planting operations, provide 2 applications over unwanted vegetation.
- C. Pre-emergent: Post landscape planting operations. Comply with manufacturers label for application and protection of existing landscape planting.

3.03 FIELD QUALITY CONTROL

- A. Tests: Chemical analysis tests shall be made of materials used on the basis of one test for each 10,000 square feet of treated area. Samples and test may be taken of both concentrates and the dilute materials as being applied. See Section 01 45 00 for provisions covering payment for testing.

3.04 PROTECTION

- A. Adjacent property, trees and plants shall be protected from injury and damage as result of operations in this Section.

END OF SECTION

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