

Project Manual

Bid Package No. 3

Volume 1 of 2

(Divisions 00 thru 14)



Flex Capacity Expansion

100 NE St. Luke's Blvd.
Lee's Summit, MO 64086

ARCHITECT:

ACI / Boland, Inc.
1710 Wyandotte Street
Kansas City, MO 64108

CIVIL ENGINEER:

McClure Engineering
1700 Swift Avenue, Suite 100
North Kansas City, MO 64116

STRUCTURAL ENGINEER:

Structural Engineering Associates
1000 Walnut, Suite 1570
Kansas City, MO 64106

MEPF ENGINEER:

W.L. Castle & Associates, Inc. | now IMEG
1600 Baltimore, Suite 300
Kansas City, MO 64108

ACIB Project No. 3-19092.00

March 30, 2020

**RELEASE FOR
CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI**

05/13/2020



PROJECT MANUAL

Bid Package No. 3

Saint Luke's East Hospital Flex Capacity Expansion

Architect

ACI / BOLAND, INC.

1710 Wyandotte St
Kansas City, Missouri 64108
(816) 763-9600

Consulting Civil Engineer & Landscape Architect

McCLURE ENGINEERING

1700 Swift Avenue, Suite 100
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P: (816) 756-0444

Consulting Structural Engineer

STRUCTURAL ENGINEERING ASSOCIATES

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Consulting MEPF Engineer

W. L. CASSELL & ASSOCIATES, INC. | now IMEG

1600 Baltimore, Suite 300
Kansas City, MO 64108
P: 816-842-8437

Specification Date

March 30, 2020

ACIB PROJECT NO. 3-19092.00

DISCLAIMER OF RESPONSIBILITY - ARCHITECT

I hereby state that all documents intended to be authenticated by my seal are limited to:

A. PROJECT MANUAL:

DIVISION 00	DIVISION 02	DIVISION 03	DIVISION 04	DIVISION 05
DIVISION 06	DIVISION 07	DIVISION 08	DIVISION 09	DIVISION 10
DIVISION 12	DIVISION 01			

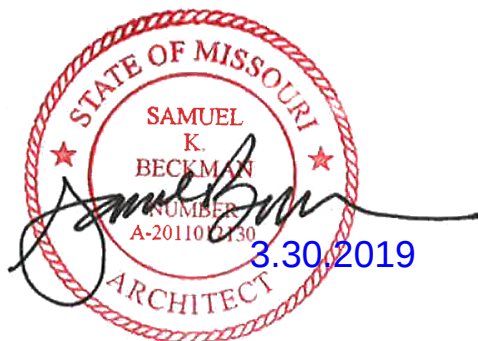
NOTE: Divisions listed include all sections listed in Table of Contents for that Division.

B. DRAWINGS:

A0.1	A0.2	A0.3	A0.4	A0.5	A0.6
A2.1	A2.2	A2.3	A2.4	A2.5	A2.6
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A3.1	A3.2	A3.3	A4.1	A4.2	A5.1
A5.2	A5.3	A6.1	A6.2	A6.3	A6.4
A6.5	A6.6	A6.7	A6.8	A6.9	A6.10
A6.11	A6.12	A6.13	A7.1	A7.2	A7.3
A7.4	A7.5	A7.6	A2.13	AD2.1	

I hereby disclaim any responsibility for all other specifications, estimates, reports or other documents or instruments related to or intended to be used for any part or parts of this architectural project.

SEAL:



Name: Samuel K. Beckman
Registration No.: Missouri / #A-2011012130
Discipline: Architect
Title: Principal
Company Name: ACI Boland Architects

DISCLAIMER OF RESPONSIBILITY - MECHANICAL

I hereby state that all documents intended to be authenticated by my seal are limited to:

A. PROJECT MANUAL:

Division 23				

NOTE: Divisions listed include all sections listed in Table of Contents for that division.

B. DRAWINGS:

DMG1	MG1.	MG1.2	DM1	DMP1
DM2	M1.1	M1.2	MP1.1	MP1.2
MP1.3	M2.1	M2.2	M3.1	M3.2
M4.0	M5.0	M6.0		

I hereby disclaim any responsibility for all other specifications, estimates, reports or other documents or instruments related to or intended to be used for any part or parts of this architectural project.

SEAL:



Name: Bruce E. Hart

State / Registration No.: Missouri E-22817

Discipline: Mechanical Engineering

Title: Principal

Company Name: W. L. Cassell & Associates, Inc.

DISCLAIMER OF RESPONSIBILITY - ELECTRICAL

I hereby state that all documents intended to be authenticated by my seal are limited to:

A. PROJECT MANUAL:

Division 26	Division 27	Division 28		

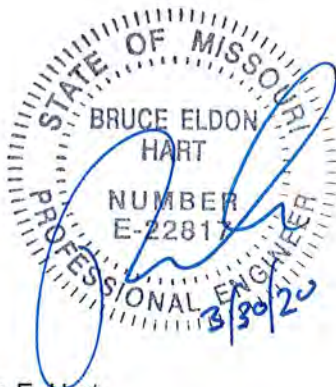
NOTE: Divisions listed include all sections listed in Table of Contents for that division.

B. DRAWINGS:

E000	DEL1.1	DEP1.1	DEC1.1	DE2.1
EL1.1	EL1.2	EP1.1	EP1.2	EC1.1
EC1.2	E2.0	E2.1	E2.2	E3.1
E3.2	E4.0	E4.1	E5.0	E5.1
E6.0				

I hereby disclaim any responsibility for all other specifications, estimates, reports or other documents or instruments related to or intended to be used for any part or parts of this architectural project.

SEAL:



Name: Bruce E. Hart
State / Registration No.: Missouri E-22817
Discipline: Electrical Engineering
Title: Principal
Company Name: W. L. Cassell & Associates, Inc.

DISCLAIMER OF RESPONSIBILITY – PLUMBING & FIRE PROTECTION

I hereby state that all documents intended to be authenticated by my seal are limited to:

A. PROJECT MANUAL:

Division 21	Division 22			

NOTE: Divisions listed include all sections listed in Table of Contents for that division.

B. DRAWINGS:

PM000	PME100	DP1	DP2	P0.1
P0.2	P1.1	P1.2	P2.1	P2.2
P3.1	P4.0			

I hereby disclaim any responsibility for all other specifications, estimates, reports or other documents or instruments related to or intended to be used for any part or parts of this architectural project.

SEAL:



Name: Bruce E. Hart

State / Registration No.: Missouri E-22817

Discipline: Plumbing Engineering

Title: Principal

Company Name: W. L. Cassell & Associates, Inc.

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A0.0	A0.1	A0.2	A0.3	A0.4	A0.5
A0.6					

CIVIL DRAWINGS: Refer to Bid Package No. 2

NONE					
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DEMOLITION DRAWINGS:

AD2.1					
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ARCHITECTURAL DRAWINGS:

A2.1	A2.2	A2.3	A2.4	A2.5	A2.6
A2.7	A2.8	A2.9	A2.10	A2.11	A2.12
A3.1	A3.2	A3.3	A4.1	A4.2	A5.1
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A6.5	A6.6	A6.7	A6.8	A6.9	A6.10
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A7.4	A7.5	A7.6	A2.13		

STRUCTURAL DRAWINGS: Refer to Bid Package No. 2

NONE					
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PLUMBING DRAWINGS:

DP1	DP2	P0.1	P0.2	P1.1	P1.2
P2.1	P2.2	P3.1	P4.0	DMG1	MG1.1
MG1.2					

MECHANICAL DRAWINGS:

DM1	DMP1	DM2	M1.1	M1.2	MP1.1
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M4.0	M5.0	M6.0			

ELECTRICAL DRAWINGS:

E000	DEL1	DEP1	DEC1	EL1.1	EL1.2
EP1.1	EP1.2	EC1.1	EC1.2	E2.0	E2.1
E2.3	E3.1	E3.2			

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Project Management Website.
- B. Allowances.
- C. Schedule of Values.
- D. Applications for Payment.
- E. Progress Payments.
- F. Application for Final Payment.
- G. Documentation of changes in Contract Sum and Contract Time.
- H. Change procedures.
- I. Correlation of Contractor submittals based on changes.
- J. Procedures for preparation and submittal of application for final payment.

1.03 RELATED REQUIREMENTS

1.04 PROJECT MANAGEMENT WEBSITE

- A. Use of Owner's Project Management Website ("e-builder") for purposes of hosting and managing project communication and documentation until Final Completion. Use of Project website shall include the following documents:
 - 1. Project Applications for Payment
 - 2. Project Requests for Information (RFI's)
 - 3. Project Architectural Supplemental Instructions (ASI's)
 - 4. Project Proposal Requests (PR's)
 - 5. Change Order Requests (COR's)
- B. Notify Owner with number of project website user licenses required. Owner will need to set-up and grant access for each user. Coordinate with Owner any fee payment required to set-up and maintain user licenses.

1.05 ALLOWANCES

- A. No cash allowances under this contract unless otherwise provided in Section 01 21 00.

1.06 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
 - 1. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
 - 2. Forms filled out by hand will not be accepted.
- B. Submit Schedule of Values in duplicate within 7 calendar days after date established in Notice of Award.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section.
 - 1. The prices are to include all labor, material, overhead, and profit applicable to each item in the breakdown. Then as a sub-breakdown each item is to be separated into an estimated labor and materials line item. The Contractor must submit an estimated total value for the projected cost of suppliers, materials, and equipment required.
- D. Revise schedule to list approved Change Orders, with each Application For Payment.

- E. Prior to making application for the first progress payment, the Contractor must submit the Schedule of Values. No progress payments will be made until the schedule of values has been received, reviewed and approved by the Architect. The costs assigned to the breakdown are to total the contract sum. The approved Schedule of Values is to be used by the General Contractor and each subcontractor on his Application for Payment.

1.07 APPLICATIONS FOR PAYMENT

- A. At a time consistent with the requirements of this section, the GENERAL CONDITIONS, and the Owner-Contractor Agreement, and for each calendar month during the progress of the work, submit a properly notarized itemized Application for Payment prepared in a manner consistent with the Schedule of Values.
 - 1. All Applications shall include the Purchase Order number generated by the Owner for the specific project.
 - 2. Submit Applications through e-builder.
- B. Application Preparation:
 - 1. Application Form:
 - a. Fill in required information, including that for change orders executed prior to the date of submittal application.
 - b. Fill in summary of dollar values to agree with the respective totals indicated on the continuation sheet.
 - c. Execute certificate with the signature of a responsible officer of the contractor's firm.
 - 2. Continuation Sheets:
 - a. Fill in total list of all scheduled component items of work, with each number and the scheduled dollar value of each item.
 - b. Fill in the dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar, or as specified in the Schedule of Values.
 - c. List each change order executed prior to the date of submission, at the end of the continuation sheets. List by change order number, proceed order no., description, and breakdown of costs as for an original component item of work.
- C. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- D. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- E. Use Form AIA G732 and Form AIA G703, edition stipulated in the Agreement.
- F. The amount shown on the Application for Payment shall be established by the value of work completed through the last day of the application period based upon the Contractor's estimate of labor and materials incorporated in the work and of materials suitably stored in accordance with the contract through the last day of the previous application, less the aggregate of previous payments, less cost of supplies, materials and equipment purchased directly by Owner, and less the retainage as specified in this Section.
 1. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
 2. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- G. Include the following with each payment application:
 1. Transmittal letter.
 2. Construction progress schedule, revised and current.
 3. Current construction photographs.
 4. Partial release of liens from major subcontractors and vendors.
 5. Final Lien Waiver and Release, when applicable.
 6. Contractor's Affidavits.
 7. Application and Certificate for Payment, and Continuation Sheets.
 8. Affidavits attesting to off-site stored products (Non-negotiable Bailment Receipt).
- H. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.08 MONTHLY PROGRESS PAYMENTS

- A. Subject to timely submittal of proper Applications for Payment by the Contractor, the Owner agrees to pay to the Contractor an amount to be determined by taking 90-percent (90%) of the value of labor and materials incorporated in the work, plus material not incorporated in the work but approved by the Architect under the provisions of the Contractor Documents, up to the date of application, less the aggregate of all previous payments, the cost of all materials, supplies and equipment paid for by the Owner and deductions provided for in the Contract Documents.
 1. 10% shall be held as retainage.
- B. The Owner shall make payment directly to the Contractor based on the amount certified by the Construction Manager and Architect on AIA Document G732-2019, Application and Certificate for Payment, Construction Manager-Adviser Edition.

1.09 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

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

1.10 APPLICATION FOR FINAL PAYMENT

- A. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements.

2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid, if appropriate.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that all claims have been settled.

1.11 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue AIA Document G710, Architect's Supplemental Instructions.
- B. Proposal Requests:
 1. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - a. Proposal Requests, issued by AIA Document G709 from the Architect, are not instructions either to stop work in progress or to execute the proposed change.
 - b. Within 14 calendar days after receipt of Proposal Request, Contractor shall submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - 1) Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 2) Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 3) Include costs of labor and supervision directly attributable to the change.
 2. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - a. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - b. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Include costs of labor and supervision directly attributable to the change.
 - e. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - f. Proposal Request Form: Use form acceptable to Architect.
- C. Construction Change Directive:
 1. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G733. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
 2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - a. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.12 CHANGE ORDERS

- A. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- B. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- C. Execution of Change Orders: Construction Manager will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- D. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- E. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- F. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Contract Document Distribution
- B. Layout of Work
- C. Grades, Lines and Levels
- D. Construction Operations
- E. Hoisting and Scaffolding

1.03 CONTRACT DOCUMENT DISTRIBUTION

- A. The Architect will an electronic disk of contract documents to include drawings, project manuals, and addenda to the Contractor. The Contractor shall then distribute the documents to subcontractors and vendors.
- B. In the case of revisions and modifications issued during construction, the Architect shall furnish the Contractor copies of each supplementary drawing or drawings changed. Changes to the work during construction will be recorded on the as-built drawing set in the Contractor's filed office. These changes to the work will be recorded by the design team at the conclusion of the project and included in the as-built documents.

1.04 LAYOUT OF WORK

- A. As soon as progress of the work permits and prior to any partition work being completed, Contractor shall layout entire full-scale floor plan for each area.
- B. Layout shall be made by snapping distinct and readable chalk lines or by painting lines, indicating the accurate thickness of walls and partitions, locations and swings of doors, similar physical features, etc. Appropriate sub-contractor shall add locations of switches, outlets, sinks, etc. All markings on surfaces shall be removed prior to the installation of the finish surface finish. Any markings left that lead to exposure through finish surface finish material shall be removed and replaced at the sole expense of the Contractor.
- C. After floor layouts have been made, contractor and/or appropriate sub-contractor shall be responsible for field checking dimensions, wall thicknesses, locations, accuracy of rough-ins, locations and dimensions of built-in equipment, and similar items of critical nature.

1.05 GRADES, LINES AND LEVELS/SURVEYING

- A. The Contractor shall establish elevation bench marks; thereafter; each Sub-contractor shall set out his own work in relation thereto, each Sub-contractor shall verify all grades, lines, levels and dimensions as shown on Drawings and shall report any errors or inconsistencies to the Contractor and Architect before commencing work.
- B. Control Datum is that established by floor level in existing building at designated locations.

1.06 CONSTRUCTION OPERATIONS

- A. The permanent or temporary establishment and operation of the equipment, apparatus, or facilities for the conduct of the work is the responsibility of the Contractor. This includes storage facilities, hoists, pumps, cranes, scaffolding, mixers, conveyors and sheds, etc. Grounds shall be kept clean to avoid danger of personal injury and to minimize hazards.

1.07 HOISTING AND SCAFFOLDING

- A. The Contractor will provide hoisting depending on crane availability, unless otherwise noted by Scope of Work. The cranes on site will primarily support concrete and masonry operations but will be available if scheduled in advance with the job site superintendent. Hoisting for steel

erection, or hoisting required for any materials which exceed the capacity of normal joisting facilities in either size or weight, or demand excessive time, shall be provided by the individual contractor or subcontractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00
PROGRESS SCHEDULE AND SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Submittal Procedures.
- B. List of Material Suppliers and Sub-Contractors.
- C. Construction Schedule Scope.
- D. Weather Delays.
- E. Shop Drawing and Product Data.
- F. Samples.
- G. Manufacturer's Instructions.
- H. Manufacturer's Certificates.
- I. Record Drawings.

1.02 SUBMITTAL PROCEDURES

- A. Contractor shall forward submittals to Construction Manager in a timely fashion, maintaining project schedule as a priority. Contractor to allow for Construction Manager and Architect's review. If submittal required expediting to maintain project schedule, a return date shall be so noted on transmittal.
- B. Each submittal shall be accompanied with a letter of transmittal. Deliver to Architect at business address. Coordinate submission of related items.
- C. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- E. Each submitting Subcontractor and then the Contractor shall apply "Contractor's stamp", signed or initialed certifying that review, 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.
- F. Contractor will prepare a schedule for submission of all shop drawings specified necessary for the equipment and materials proposed for and incorporated in the work or erection drawings needed for proper installation, operation or maintenance. The schedule shall accompany the work progress schedule submitted to Architect".
- G. Contractor, in establishing his schedule for submittals, shall allow fourteen (14) calendar days in Architect's office for reviewing original submittals and seven (7) calendar days in Architect's office for reviewing re-submittals.
- H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.
- I. Provide space for Contractor, Construction Manager, and Architect review stamps.
- J. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- K. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.03 LIST OF MATERIAL SUPPLIERS AND SUBCONTRACTORS

- A. Within fourteen (14) days after signing of Contract, the Contractor shall furnish to the Construction Manager a complete list of all materials, material suppliers, and subcontractors he intends to use on this project. The listing shall be made in such a manner to show brand names, referenced section of the work, Subcontractor's name, address, and telephone number.

1.04 CONSTRUCTION PROGRESS SCHEDULE

- A. Coordinate with Construction Manager.

1.05 WEATHER DELAYS

- A. Weather Delays. The following are considered reasonable anticipated CALENDAR days of adverse weather on a monthly basis and shall be included in the construction schedule:
- | | |
|------------------|-------------------|
| January: 10 days | July: 5 days |
| February: 9 days | August: 4 days |
| March: 7 days | September: 3 days |
| April: 6 days | October: 2 days |
| May: 4 days | November: 4 days |
| June: 5 days | December: 7 days |
- B. Adverse weather days beyond the above total will be allowed only to the extent authorized by the Architect and the Owner and established by the Construction Manager as actually causing a delay in critical path work. Adverse weather days shall be recorded and submitted, in writing, for the Owner's and Architect's review and approval on a monthly basis.

1.06 SHOP DRAWINGS AND PRODUCT DATA

- A. Contractors shall submit electronic shop drawings, erection drawings, and setting drawings:
1. Shop drawings shall be submitted in a format that is compatible with the Owner's Facility Maintenance Management System. Coordination with the Owner will be required to confirm compliance.
- B. Submittals shall include the following:
1. Manufacturer's specifications.
 2. Fabrication and erection drawings
 3. Bills of materials and spare parts lists.
 4. Instruction books.
 5. Samples, color charts and similar items.
 6. All drawings, catalogs, or parts thereof, manufacturer's specification and data, samples, instruction, written guarantees and other information specified or necessary for the Architect to determine that the equipment and materials conform with the design concept and comply with the intent of the Contract Documents.
 7. For Architect to determine that the equipment and materials conform with the design concept and comply with the intent of the Contract Documents.
 8. For the proper erection, installation, operation and maintenance of the equipment and materials which Architect will review for general content but not for substance.
 9. For Architect to determine the effect on contiguous or related structures, equipment, and materials.
 10. Data submitted shall be complete with respect to dimensions, design criteria, materials of construction and the like to enable Architect to review the information effectively. Where standard drawings are furnished which cover a number of variations of the general class of equipment, each such drawing shall be individually annotated to describe exactly which parts of the drawings apply to the equipment being furnished. Such annotation shall also include proper identification of the submittal permanently attached to the drawing. Reproduction of copies of Contract Drawings or portions thereof will not be accepted as fabrication or erection drawings.
 11. General outline drawings of equipment showing overall dimensions, location of major components, weights, and locations of required building openings and floor plates.
 12. General outline drawings of equipment showing overall dimensions, location of major components, weights, and locations of required building openings and floor plates.
 13. Detailed equipment installation drawings showing foundation details, anchor bolt sizes and locations, base plate sizes, location of Owner's connections; and all clearances required for erection, operations and disassembly for maintenance.

14. Schematic diagrams for electrical items showing external connections, terminal block numbers, internal wiring diagrams, and one-line diagrams.
- C. Each shop drawing submitted shall bear the stamp of the submitting Contractor and signed by their representative indicating he/she has reviewed and approved the submittal prior to transmittal to the Construction Manager. Construction Manager shall identify each submittal by project title and the Specification division and article number marked thereon.
- D. Contractor shall submit the designated quantity of drawings to the Construction Manager for review and processing prior to sending to Architect.
- E. The Architect shall pass upon these drawings with reasonable promptness, making necessary corrections, including any necessary corrections relating to artistic effect. Drawings will be reviewed on a first-come basis. The Contractor shall make any revisions required by the Architect and re-submit when so noted and marked by the Architect.
- F. Architect's review action stamp, appropriately completed, will appear on all shop drawings of Contractor when returned by Architect.
- G. Architect's review of drawings is performed to assist subcontractor/s and supplier/s in proper application and/or installation of material and product only and is not either a warranty that all information pertaining to the submitted drawings are accurate and/or complete, nor does it relieve contractor, subcontractor or supplier's responsibility for proper installation, selection, or application of product/material. It remains the responsibility of the subcontractor and/or supplier to bring any discrepancy or inaccuracy to the immediate attention of the Architect prior to production and/or installation.
- H. A complete set of all shop drawings shall be supplied to the Owner at the completion of the project as a part of the close-out documents. These shop drawings shall be formatted such that they can easily be uploaded into the Owner's Facility Maintenance Management System.

1.07 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work. Samples are not required if the product submitted matches the specification without exception. Saint Luke's maintains a set of product standards and if sample matches that exact standard, a submittal is not required. If submitted, the Architect will return without review.
- B. Submit samples of finishes from the full range of manufacturers' standard colors (custom colors where specified), textures, and patterns for Architect's selection, where applicable.
- C. Include identification on each sample, with full project information.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, (start-up), adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and contract documents.
- C. All manufacturer articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless specified otherwise.

1.09 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturer's certificate to Architect for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product but must be acceptable to Architect.

1.10 RECORD DRAWINGS

- A. Construction Manager shall provide, and keep up-to-date, a complete record set of prints which shall be corrected on a daily basis to show all changes in layouts and details from original drawings and specifications. Prints for this purpose shall be provided by the Owner, through the Architect. The Contractor and Owner's Representative will monitor the updating of the as-built conditions. Compliance for updating as-built conditions will be strictly enforced.
- B. At the completion of the work or a phase, the Construction Manager shall date and mark the prints "Record Drawings" then transmit them to the Architect for review. Architect/Engineer will modify original drawing Autocad or Revit files to "Record Drawings" conditions.
- C. Reference Project Record Documents - Section 01 70 00 - Contract Closeout.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Quality Assurance/General Requirements for Workmanship
- B. Quality Control and Inspections
- C. Field Samples
- D. Mock-Up
- E. Inspection and Testing Laboratory Services
- F. Manufacturer's Field Services and Reports

1.03 QUALITY ASSURANCE / GENERAL REQUIREMENTS FOR WORKMANSHIP

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Manufacturer's requirements shall be strictly followed for storage, preparation, installation, cleaning, protecting and testing of all products and materials except where specific requirements included in appropriate Sections in Division 1 through Division 16 exceed those requirements. Where conflicts between manufacturer's requirements and Contract Documents occur, Contractor shall notify Construction Manager and request resolution prior to proceeding. Construction Manager shall request clarification from Architect before proceeding.
- C. Perform work by persons qualified to produce workmanship of specified quality. Work which properly should be done by skilled labor shall not be attempted with common laborers. The Contractor shall have on the job, at all times, ample equipment to carry on the work properly, including such tools as may be necessary to meet emergency requirements.
- D. Each Contractor is to inspect jobsite, coordinate with other trades and field verify dimensions where applicable prior to fabricating product or material.
- E. Manufacturer's requirements and industry standards are to be followed in regards to the effect of temperature, moisture and humidity on products and materials.
- F. Materials and equipment are to be installed plumb, level and true, with uniform joints and edge conditions, tight seams and neatly fitting adjoining materials, unless specifically shown otherwise.
- G. Install materials and equipment as dimensioned on the drawings. If dimensions or height are not dimensioned on the drawings, Construction Manager is to issue a Request for Information to Architect requesting location of item in question.
- H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- I. Cleaning of materials and equipment shall be completed in a manner as not to damage finish.
- J. Equipment and material shall be protected by installing Contractor following installation with labels intact until final cleaning.

1.04 QUALITY CONTROL AND INSPECTIONS - RESPONSIBILITIES

- A. Each Contractor shall advise the Construction Manager's on-site field superintendent of all scheduled tests three working days in advance. Contractor's quality control representative shall review his drawings, procurement documents and contracts to ensure that technical information provided, and all work performed, is in accordance with latest revision of Contract Documents. Contractor shall maintain a complete set of original Contract Documents, including contract drawings and specifications, on site for work performed under his contract. These documents

shall be updated to reflect all changes made through Addenda, Change Orders and Requests for Information.

- B. Contractor's quality control representative shall perform an inspection upon receipt at the site, of all materials, equipment and supplies. Items which are damaged or not in conformance with respective submittals, quality standards, contract documents, contract drawings and specifications, shall be identified and segregated from accepted items. Items thus identified will not be incorporated into the work until corrective action, acceptable to the Construction Manager and Architect is completed.
- C. Each Contractor is responsible for quality of the work performed by his work force and sub-Subcontractors, as well as quality of the material, equipment and supplies furnished by Subcontractor to be incorporated into the work. Subcontractor shall designate a quality control representative who will be on site at all times when work is in progress.

1.05 REFERENCES

- A. Conform to reference standard by date of issue current on date of contract documents.
- B. Obtain copies of standards when required by contract documents.
- C. Should specified reference standards conflict with contract documents, request clarification from Architect before proceeding.
- D. The contractual relationship of the parties to the contract shall not be altered from the contract documents by mention or inference otherwise in any reference document.

1.06 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications sections for review.
- B. Acceptable samples represent a quality level for the work.
- C. Where field sample is specified to be removed in individual sections, clear the area when directed by Architect.

1.07 MOCK-UPS

- A. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
- B. When the project dictates and/or as indicated in the construction documents, major interior mock-ups shall be completed prior to allow other activities to avoid potential conflicts and/or change order requests. This activity shall be acknowledged in the overall project schedule. Work that proceeds in advance of an approved mock-up that must be redone is not subject to additional compensation by the Owner.
- C. Where mock-up is specified to be removed in individual sections, clear the area when directed by Architect.

1.08 INSPECTION AND TESTING LABORATORY SERVICES

- A. Owner will appoint, employ, and pay for services of an independent firm to perform inspections and testing, except when a specification section specifically states that testing work be provided for by the Contractor. Testing will include, but not be limited to, the following:
 - 1. Special Inspections as required by the 2018 International Building Code.
 - 2. Earthwork-, Structural-, and Fireproofing-Testing, will be by Owner-furnished independent laboratory or Structural Engineer.
- B. Mechanical and Electrical Testing will be furnished by the respective Contractor.
- C. The HVAC air and water balance and plumbing water balance shall be performed the Mechanical Contractor.
- D. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Architect.
- E. Reports will be submitted by the independent firm to the Architect, indicating observations and results of tests and indicating compliance or noncompliance with contract documents. Provide

copies to the Architect (1), Structural Engineer (1), Contractor (1), The Concrete Subcontractor and Consulting Geotechnical Engineer shall each receive (1) when applicable.

- F. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify Architect and independent firm 48 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- G. Retesting required because of nonconformance to specified requirements shall be performed by the same independent firm on instructions by the Architect. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the contract sum.

1.09 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to Architect (30) days in advance of required observations. Observer subject to approval of Architect and Owner.
- B. When specified in individual specifications sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment, as applicable, and to initiate instructions when necessary.
- C. Individuals are to report observations and on-site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers written instructions.
- D. Submit report within (30) days of observation to Architect / Engineer for review.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 00

CONCRETE IN-SITU RELATIVE HUMIDITY AND PH TESTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Provide in-situ concrete relative humidity and surface pH testing to all concrete specified to be covered with polished concrete floor finish, ceramic/porcelain tile, wood sports flooring, resilient floor coverings, tile carpeting, or resinous coatings.

1.03 RELATED REQUIREMENTS

- A. Section 09 30 00 - Tiling
- B. Section 09 65 00 - Resilient Flooring
- C. Section 09 68 13 - Tile Carpeting
- D. Section 09 69 23 - Resinous Flooring, Base, and Wall Systems

1.04 REFERENCES

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
- B. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes.
- C. ASTM F2659 - Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter

1.05 SUBMITTALS

- A. Report all test results in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.
- B. List test locations on chart and show same on 8 ½ x 11 site map (when such map is made available to testing agency)
- C. Deliver results in duplicate for distribution to Architect, Owner, Construction Manager, etc.

1.06 QUALITY ASSURANCE

- A. Digital "Reader" and calibrated relative humidity sensors.
 - 1. NIST-traceable factory calibration
- B. Owner Responsibilities: Where indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
- C. Independent Testing Agency:
 - 1. Contractor Responsibilities: The flooring subcontractor/s will engage a qualified testing agency to perform the testing services specified below.
- D. Commercially Produced Moisture Vapor Emission Test Kits
 - 1. Test dish including calcium chloride must be commercially packaged and delivered to test site in sealed factory wrapping
 - 2. Test dome from same source as dish.
 - 3. Test kit must comply with ASTM standards of size and weight.
- E. Wide range pH paper and distilled or de-ionized water.

1.07 COORDINATION

- A. Testing includes concrete placed below, on and above grade
- B. Testing shall take place after allowing concrete to dry for a minimum of 28 days.

- C. Testing is to be scheduled no less than 1 and no more than 6 weeks prior to scheduled flooring installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Electronic Moisture Meter:
 - 1. Specified Manufacturer: Tramex LTD
P: 800-234-5849
Email: sales@tramexmeters.com
Web: www.tramexmeters.com
- B. pH Test Paper:
 - 1. Specified Manufacturer: Micro Essential Laboratory Inc
PO Box 100824
Brooklyn, New York 11210
P: 718-338-3618
Email: custserv@microessentiallab.com
Web: www.microessentiallab.com
- C. pH Meter:
 - 1. Specified Manufacturer: Wagner Meters
326 Pine Grove Road
Rogue River, Oregon 97537
P: 844-854-2472
Email: info@wagnermeters.com
Web: www.wagnermeters.com
- D. Substitutions: The manufacturers specified above are to establish a standard of quality for the testing methods specified. Equivalent products by other manufacturers are acceptable.

PART 3 EXECUTION

3.01 QUANTIFYING RELATIVE HUMIDITY LEVEL

- A. In-situ relative humidity testing shall comply with the requirements of ASTM F2170.
- B. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period.
- C. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 sq.ft. and 1 per each additional 1,000 square feet.
- D. Test Method:
 - 1. Determine the thickness of the concrete slab, typically from construction documents.
 - 2. Utilizing a roto-hammer, drill test holes to a depth equal to 40% of the concrete thickness. Hole diameter shall not exceed outside diameter of the probe by more than 0.04". Drilling operation must be dry.
 - a. Exception: Elevated structural slab (not poured in pans) should be tested at a depth equal to 20% of its thickness.
 - 3. Vacuum and brush all concrete dust from test hole.
 - 4. Insert a relative humidity probe (sensor) to the full depth of test hole. Place cap over probe.
 - 5. Permit the test site to acclimate, or equilibrate for 24 hours prior to taking relative humidity readings.
 - 6. Remove the cap and insert the cylindrical reading device to obtain reading from the in-situ probe.
 - 7. Read and record temperature and relative humidity at the test site.
- E. Acceptable Testing Equipment:

1. Tramex® CMEX II Electronic Moisture Meter, with the optional Tramex Hygro-i ® relative humidity probe, or equal.

3.02 QUANTIFYING MOISTURE CONTENT LEVEL

- A. Moisture Content testing shall comply with the requirements of ASTM F2659.
- B. Perform test using an electronic moisture meter to get an instant and precise evaluation of the moisture conditions within 1-inch below the surface of the slab.
 1. The electronic moisture meter gives a measurement of the percentage (%) of moisture content by weight.
 2. Acceptable Testing Equipment:
 - a. Tramex® CMEX II Electronic Moisture Meter, or equal.
- C. Record and report results.

3.03 QUANTIFYING PH LEVEL

- A. pH testing shall comply with the requirements of ASTM F710.
- B. Perform pH test at or near the relative humidity test site.
- C. Standard Test Method:
 1. Place several drops of distilled and/or de-ionized water onto the concrete surface to form a puddle approximately 1" in diameter.
 2. Allow the water to set for approximately 60 seconds
 3. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.
 4. Record and report results.
- D. Alternate Test Method: Electronic pH Meter.
 1. Acceptable Testing Equipment:
 - a. Wagner, Rapid RH® Digital pH Meter, or equal.

END OF SECTION

SECTION 01 45 33

CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.
- D. Manufacturers' field services.
- E. Fabricators' field services.

1.02 ABBREVIATIONS AND ACRONYMS

- A. AHJ: Authority having jurisdiction.
- B. IAS: International Accreditation Service, Inc.
- C. NIST: National Institute of Standards and Technology.

1.03 DEFINITIONS

- A. Code or Building Code: ICC (IBC)-2018, Edition of the International Building Code and specifically, Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. Special Inspection:
 - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved Contract Documents and the referenced standards.
 - 2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.04 SUBMITTALS

- A. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency is required to:
 - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit certification that Special Inspection Agency is acceptable to AHJ.
 - 4. Submit documentation that Special Inspection Agency is accredited by IAS according to IAS AC291.
- B. Testing Agency Qualifications: Prior to the start of work, the Testing Agency is required to:
 - 1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit certification that Testing Agency is acceptable to AHJ.
- C. Smoke Control Testing Agency Qualifications: Prior to the start of work, the Testing Agency is required to:
 - 1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

2. Submit documentary evidence that agency has appropriate credentials and documented experience in fire protection engineering, mechanical engineering and HVAC air balancing.
3. Submit certification that Testing Agency is acceptable to AHJ.
- D. Manufacturer's Qualification Statement: Manufacturer is required to submit documentation of manufacturing capability and quality control procedures. Include documentation of AHJ approval.
- E. Special Inspection Reports: After each special inspection, Special Inspector is required to promptly submit copies of report to the Owner, Architect, Construction Manager, and AHJ.
- F. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector is required to promptly submit copies of the report to the Owner, Architect, Construction Manager, and AHJ.
- G. Test Reports: After each test or inspection, promptly submit copies of the report to the Owner, Architect, Construction Manager, and AHJ.
- H. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Architect and AHJ, in quantities specified for Product Data.
 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and AHJ.
- I. Manufacturer's Field Reports: Submit reports to Architect, Construction Manager, and AHJ.
 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.
- J. Fabricator's Field Reports: Submit reports to Architect, Construction Manager, and AHJ.
 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.

1.05 SPECIAL INSPECTION AGENCY

- A. Owner will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.06 TESTING AND INSPECTION AGENCIES

- A. Owner may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.07 QUALITY ASSURANCE

- A. Special Inspection Agency Qualifications:
 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
- B. Testing Agency Qualifications:
 1. Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.

1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.
2. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

3.02 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION

- A. Structural Steel: Comply with quality assurance inspection requirements of ICC (IBC).
- B. Cold-Formed Steel Deck: Comply with quality assurance inspection requirements of SDI (QA/QC).
- C. Open-Web Joists and Joist Girders: Comply with requirements of ICC (IBC), Table 1705.2.3.
 1. End Connections - Welding or Bolted: Comply with requirements of SJI 100; periodic.
 2. Bridging - Horizontal or Diagonal:
 - a. Standard Bridging: Comply with requirements of SJI 100; periodic.
 - b. Bridging That Differs From the SJI Specifications: Periodic inspection.

3.03 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

- A. Refer to Bid Package No. 2.
- B. Reinforcement, Including Prestressing Tendons, and Verification of Placement: Verify compliance with ACI 318, Chapters 20, 25.2, 25.3, 26.6.1-26.6.3; periodic.
- C. Reinforcing Bar Welding: Verify compliance with AWS D1.4/D1.4M and ACI 318, 26.6.4; periodic.
- D. Anchors Cast in Concrete: Verify compliance with ACI 318, 17.8.2; periodic.
- E. Anchors Post-Installed in Hardened Concrete: Verify compliance with ACI 318.
- F. Design Mix: Verify plastic concrete complies with the design mix in approved Contract Documents and with ACI 318, Chapter 19, 16.4.3, 26.4.4; periodic.
- G. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Chapter 26.5, 26.12, and record the following, continuous:
 1. Slump.
 2. Air content.
 3. Temperature of concrete.
- H. Specified Curing Temperature and Techniques: Verify compliance with ACI 318, Chapter 26.5.3-26.5.5; periodic.
- I. Materials: If the Contractor cannot provide sufficient data or documentary evidence that concrete materials comply with the quality standards of ACI 318, the AHJ will require testing of materials in accordance with the appropriate standards and criteria in ACI 318, Chapters 19 and 20.

3.04 SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION

- A. Masonry Structures Subject to Special Inspection:
 1. Masonry construction when required by the quality assurance program of TMS 402/602.
 2. Empirically designed masonry, glass unit masonry and masonry veneer in structures designated as "essential facilities".
 - a. Perform inspections in accordance with Level B Quality Assurance.

3.05 SPECIAL INSPECTIONS FOR SPRAYED FIRE RESISTANT MATERIALS

- A. Sprayed Fire Resistant Materials, General:
 1. Verify compliance of sprayed-fire resistant materials with specific fire-rated assemblies indicated in approved Contract Documents, and with applicable requirements of the building code.

2. Perform special inspections after rough installation of electrical, mechanical, plumbing, automatic fire sprinkler and suspension systems for ceilings.
- B. Physical and visual tests: Verify compliance with fire resistance rating.
 1. Condition of substrates; periodic.
 2. Thickness of sprayed fire resistant material; periodic.
 3. Density of sprayed fire resistant material in pounds per cubic foot (kg per sq m); periodic.
 4. Bond strength (adhesion and cohesion); periodic.
 5. Condition of finished application; periodic.
- C. Structural member surface conditions:
 1. Inspect structural member surfaces before application of sprayed fire resistant materials; periodic.
 2. Verify preparation of structural member surfaces complies with approved Contract Documents and manufacturer's written instructions; periodic.
- D. Application:
 1. Ensure minimum ambient temperature before and after application complies with the manufacturer's written instructions; periodic.
 2. Verify area where sprayed fire resistant material is applied is ventilated as required by the manufacturer's written instructions during and after application; periodic.
- E. Thickness: Verify that no more than 10 percent of thickness measurements taken from sprayed fire resistant material are less than thickness required by fire resistance design in approved Contract Documents. In no case shall the thickness of the sprayed fire resistant material be less than the minimum below.
 1. Minimum Allowable Thickness: Tested according to ASTM E605/E605M, periodic.
- F. Density: Verify density of sprayed fire resistant material is no less than density required by the fire resistance design in the approved Contract Documents.
- G. Bond Strength: Verify adhesive and cohesive bond strength of sprayed fire resistant materials is no less than 150 pounds per square foot (7.18 kPa) when in-place samples of the cured material are tested according to ASTM E736/E736M and as described below.

3.06 SPECIAL INSPECTIONS FOR MASTIC AND INTUMESCENT FIRE RESISTANT COATINGS

- A. Verify mastic and intumescent fire resistant coatings comply with AWCI 117 and the fire resistance rating indicated on approved Contract Documents.

3.07 SPECIAL INSPECTIONS FOR EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

- A. Verify water resistive barrier coating applied over sheathing complies with ASTM E2570/E2570M.

3.08 SPECIAL INSPECTIONS FOR FIRE RESISTANT PENETRATIONS AND JOINTS

- A. Verify penetration firestops in accordance with ASTM E2174.
- B. Verify fire resistant joints in accordance with ASTM E2393.

3.09 SPECIAL INSPECTIONS FOR SMOKE CONTROL

- A. Test smoke control systems as follows:
 1. Record device locations and test system for leakage after erection of ductwork but before starting construction that conceals or blocks access to system.
 2. Test and record pressure difference, flow measurements, detection function and controls after system is complete and before structure is occupied.

3.10 OTHER SPECIAL INSPECTIONS

- A. Provide for special inspection of work that, in the opinion of the AHJ, is unusual in nature.
- B. For the purposes of this section, work unusual in nature includes, but is not limited to:
 1. Construction materials and systems that are alternatives to materials and systems prescribed by the building code.
 2. Unusual design applications of materials described in the building code.

3. Materials and systems required to be installed in accordance with the manufacturer's instructions when said instructions prescribe requirements not included in the building code or in standards referenced by the building code.
- C. Alternative Test Procedures: Where approved rules and standards do not exist, test materials and assemblies as required by AHJ or provide AHJ with documentation of quality and manner in which those materials and assemblies are used.

3.11 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

- A. Special Inspection Agency shall:
 1. Verify samples submitted by Contractor comply with the referenced standards and the approved Contract Documents.
 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified reference standards.
 4. Ascertain compliance of materials and products with requirements of Contract Documents.
 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
 6. Perform additional tests and inspections required by Architect.
 7. Submit reports of all tests or inspections specified.
- B. Limits on Special Inspection Agency Authority:
 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the work.
- C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.12 TESTING AGENCY DUTIES AND RESPONSIBILITIES

- A. Testing Agency Duties:
 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 2. Perform specified sampling and testing of products in accordance with specified standards.
 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
 5. Perform additional tests and inspections required by Architect.
 6. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the work.
- C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.13 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities, General:

1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

3.14 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES

- A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment and _____ as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. General Product Requirements
- B. Transportation and Hauling.
- C. Installation Requirements.
- D. Identifying Markings.
- E. Product Approval Standards.
- F. Installation of Products.
- G. Substitutions.

1.03 GENERAL PRODUCT REQUIREMENTS

- A. General: Provide products, materials, and equipment which comply with requirements, and which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation for intended use and effect.
- B. Any product, material or piece of equipment that contains asbestos or other hazardous material is not acceptable.
- C. Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.
- D. Continued Availability: Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.

1.04 TRANSPORTATION AND HAULING

- A. Materials, products, and equipment shall be properly containerized, packaged, boxed and protected to prevent damage during transportation and handling.
- B. More detailed requirements for transportation and handling are specified under the technical sections.

1.05 INSTALLATION REQUIREMENTS

- A. Furnish, apply, install, connect, erect, clean and condition manufactured articles, materials, and equipment per manufacturers' printed directions, unless otherwise indicated or specified.
- B. Manufacturer's printed directions must be on job prior to and during installation of materials and equipment.
- C. Provide all attachment devices and materials necessary to secure materials together or to other materials and to secure work of other trades.
- D. Make field check of actual building dimensions before fabricating products.
- E. Where proper fit of work depends upon close tolerances of manufactured products, furnish manufacturer with necessary templates to insure proper fit of all components.
- F. Handle materials in a manner to prevent scratching, abrading, distortion, chipping, breaking or other disfigurement.
- G. Conduct work in a manner to avoid injury to previously placed work.

1.06 IDENTIFYING MARKINGS

- A. Name Plates: Except as otherwise indicated for required labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the work.
- B. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.
- C. Equipment Name Plates: Provide permanent nameplate on each item of service-connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data. Locate name plates on an easily accessed surface which, in occupied spaces, is not conspicuous.

1.07 PRODUCT APPROVAL STANDARDS

- A. Definitions:
 - 1. The term product shall include materials, equipment, assembly methods, manufacturer, brand, trade name and other description.
 - 2. References to approved equal or similar items mean that approval of the Architect is required in writing.
- B. Where materials or equipment are described but not named, provide required first-quality items, adequate in every respect for the intended use; such items shall be subject to the Architect's approval prior to procurement.
- C. Proof of Compliance: Whenever the Contract Documents require that a product be in accordance with Federal Specifications, ASTM designation, ANSI Specification, or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. When requested or specified, submit supporting test data to substantiate compliance.

1.08 INSTALLATION OF PRODUCTS

- A. General: Except as otherwise indicated, particularly in individual work sections of these specifications, comply with manufacturer's instructions and recommendations for installation of products in applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of acceptance.

1.09 SUBSTITUTIONS

- A. Substitutions Prior to Bid Date: For inclusion of products other than those specified, Bidders shall submit a request in writing at least ten (10) days prior to bid date. Requests received after this time will not be reviewed or considered regardless of cause. Requests shall clearly define and describe the product for which inclusion is requested. Inclusion by the Architect will be in the form of an addendum to the specifications, issued to all bidders on record.
 - 1. The burden of proof of the merit of the proposed substitution is upon the proposer and shall provide a feature by feature comparison of the specified (approved) product or material, with the proposed substitution. Submissions without a thorough comparison chart will not be considered. The substitution shall not cause the cost of the project to increase. The Owner and Architect's decision of approval or disapproval of a proposed substitution shall be final.
- B. Substitutions after Award of Contract: Substitution of products will be considered after award of contract only under one of the following conditions:
 - 1. When the specified product is not available, a proposed substitution will not be considered unless proof is submitted that firm orders were placed within ten (10) days after review by the Architect of the item listed in the specification, or the unavailability is due to a strike, lockout, bankruptcy, discontinuance of the manufacturer of a product, or natural disasters.

2. When a guarantee of performance is required and, in the judgment of the Contractor, the specified product or process will not produce the desired results.
 3. Request for such substitution shall be made in writing to the Architect within ten (10) days of the date that the contractor ascertains he cannot obtain the material or equipment specified, or that the performance cannot be guaranteed.
- C. Procedures Respecting Substitutions:
1. Materials and equipment proposed for substitution shall be equal or superior to that specified in construction, efficiency, utility, aesthetic design, and color, as determined by the Architect, whose decision shall be final and without further recourse. Physical size of substitute brand shall not be larger than the space provided for it. Requests must be accompanied by full description and technical data, in two copies, including manufacturer's name, model, catalog number, photographs or cuts, physical dimensions, operating characteristics, and any other information necessary for comparison.
 2. Permission to make any substitution after award of the contract shall be affected by a no cost Change Order. It shall not relieve the Contractor, any subcontractor, manufacturer fabricator or supplier from responsibility for any deficiency that may exist in the substituted product or for any departures or deviations from the requirements of the contract documents, as modified by such Change Order. Except as otherwise expressly specified by the contractor in his request for substitution and shall be deemed to warranty by his request that the proposed substituted product will satisfy all standards and requirements satisfied by the originally specified product and the Change Order shall not be deemed to modify the contract documents with respect thereto.
 3. If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the contractor without additional expense to the Owner, if and when accepted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 65 00
STARTING OF SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.

1.03 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner's Representative seven days prior to start-up of each item. All start-up of systems shall be done as directed by the Owner. Owner shall notify the Architect that all systems are operating as designed before final payment will be released. A third party commissioning agent may be engaged. Mechanical contractor to coordinate with Owner and Commissioning Agent on all system start-ups, if required.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative and Contractor's personnel in accordance with manufacturer's instructions.
- G. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 014000 that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project Equipment by a qualified Manufacturer's Representative who is knowledgeable about the project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble shooting, serving, maintenance, and shutdown of each item of equipment at schedule agreed on times and at designated location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is as needed or that specified in individual sections.

PART 2- PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Substantial Completion.
- B. Final Cleaning.
- C. Adjusting.
- D. Project Record Documents.
- E. Operation and Maintenance Data.
- F. Warranties.
- G. Final Lien Waivers
- H. Spare Parts and Maintenance Materials.
- I. Documents required for Closeout.

1.03 SUBSTANTIAL COMPLETION

- A. The Contractor and each subcontractor shall carefully and regularly check their work for conformance with the contract documents as the work is being done. Unsatisfactory work shall be corrected as the work progresses and not be permitted to remain and become a part of the Punch List.
- B. Preliminary Punch List Inspection: Coordinate with the Construction Manager.
- C. When issued, the Certificate of Substantial Completion shall name the date, triggering the beginning of the warranty period (with any items to have a later starting date specifically noted). The Certificate shall also have attached to it the uncompleted punch list items and shall name the date for their completion.
- D. Acknowledgment of the date of Substantial Completion by the signature of all parties on the Certificate implies possession of the premises by the Owner, and completion of incomplete punch list items by the contractor and the subcontractors, at the Owner's convenience. The Owner shall cooperate in permitting the contractor access to the work for the completion of punch list items.

1.04 FINAL CLEANING

- A. Execute final cleaning prior to final inspection. Owner will not take possession until they have approved final cleaning.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition. Clean all lighting fixtures in areas affected by construction.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation. Follow scope as directed by Owner or third-party commissioning agent.

1.06 PROJECT RECORD DOCUMENTS

- A. Construction Manager shall maintain on site, one set of the following record documents; record actual revisions to the work:
 - 1. Contract Drawings.
 - 2. Project Manual.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Project Manual: Legibly mark and record at each product section description of actual products installed including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
- F. Measured depths of foundations in relation to finish first or main floor datum.
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original contract drawings.
- G. Submit documents to Architect in electronic format with claim for final application for payment.

1.07 OPERATION AND MAINTENANCE DATA

- A. Submit two (2) hard copy sets prior to final inspection, bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers or via electronic disk as deemed by Architect and Owner based on project scope. All O&M data and information shall be compatible for upload into the Owner's Facility Maintenance Management System. Confirm with Owner on requirements.
- B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, (and subject matter of binder when multiple binders are required).
- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, type on 24-pound white paper.
- E. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, major equipment suppliers.
- F. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
 - 1. Significant design criteria.
 - 2. List of equipment.
 - 3. Parts list for each component.
 - 4. Starting and operating instructions, end of season shutdown instructions.
 - 5. Maintenance instructions and schedules for equipment and systems.
 - 6. Maintenance instructions and schedule for (special) finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
- G. Part 3: Project documents and certificates, including the following:

1. Shop drawings and product data.
 2. Air and water balance reports.
 3. Certificates.
 4. Photocopies of warranties. When warranty certificates are not available, a description of the manufacturer's standard warranty shall be acceptable.
- H. Submit one copy of completed volumes in final form two weeks prior to date of Substantial Completion. This copy will be returned (after final inspection), with Architect comments. Revise content of documents as required prior to final submittal.
- I. Submit final volumes revised, within ten days after final inspection. The final submission shall include any electronic copies as directed by the Owner.

1.08 WARRANTIES

- A. Bind in commercial quality, 8-1/2 x 11 inch three-ring side binders with hardback, cleanable, plastic covers or via electronic disk as deemed appropriate by Owner.
- B. Label cover of each binder with types or printed title WARRANTIES AND BONDS with title of project, name, address and telephone number of contractor and equipment supplier; and name of responsible individual.
- C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of the product or work item.
- D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, suppliers, and manufacturer, with name, address, and telephone number of responsible principals.
- E. Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable time or work. Include items put into use with Owner's permission. Date of beginning of time of warranty shall be the Date of Substantial Completion.
- F. Verify that warranties are in proper form, contain full information, and are notarized.
- G. Co-execute submittals when required.
- H. Retain warranties and bonds until time specified for submittal.
- I. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
- J. For items of work when acceptance is delayed beyond date of substantial completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
- B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

1.10 DOCUMENTS REQUIRED FOR CLOSE-OUT

- A. The following documents will be utilized during the closeout of all construction projects. They include:
1. Certificate of Substantial Completion (AIA Document G704).
 2. Contractor's Partial Lien Waiver and Affidavits.
 3. Contractor's Final Release and Waiver of Lien.
 4. Consent of Surety Company to Final Payment (AIA Document G707).
 5. Consent of Surety to Reduction in or Partial Release of Retainage (AIA Document G707A).
 6. Any other documents, as notified in advance by Owner, specific to project, operations and/or policies instituted by Saint Luke's Health System.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02 30 50
AVAILABLE SITE INFORMATION

PART 1 GENERAL

1.01 EXISTING SITE CONDITIONS

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders.

1.02 SITE SURVEY

- A. Preparer: McClure Engineering (Lenexa, Kansas), dated June 20, 2019.
 - 1. Availability:
 - a. Original copy is available for inspection at preparer's office during normal business hours.
 - b. Electronic copy will be available from the preparer.
- B. This survey identifies grade elevations prepared primarily for the use of Architect in establishing new grades and identifying natural water shed.
- C. Surveys are for Bidder's and Contractor's review and information only. Contractor's and Bidder's are responsible for verifying elevations and measurements, and for making their own determination of site conditions the survey as may be necessary to prepare their bids and perform the Work.
 - 1. Variations between conditions indicated and actual conditions will not be considered reason for change in Contract amount or time.

1.03 GEOTECHNICAL REPORT

- A. Preparer: Terracon Consultants, Inc. (Lenexa, Kansas), dated November 18, 2019.
 - 1. Availability:
 - a. Original copy is available for inspection at preparer's office during normal business hours.
 - b. Electronic copy will be available from the preparer.
- B. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
- C. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
- D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
 - 1. Geotechnical Report is for Bidder's and Contractor's review and information only. Contractor's and Bidder's are responsible for making their own determination of site conditions as may be necessary to prepare their bids and perform the Work.
 - a. Variations between conditions indicated and actual conditions will not be considered reason for change in Contract amount or time.
- E. Neither the Owner nor the Architect guarantees the accuracy and completeness of information and data provided on the survey and geotechnical report, including that concerning type and location of underground materials and utilities.
- F. Report discrepancies between conditions shown and actual conditions to the Architect.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 02 41 00
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Saint Luke's Health System - Pre-Construction Risk Assessment Form.

1.02 SECTION INCLUDES

- A. Demolition and removal of selected portions of building or structure.
- B. Salvage of existing items to be reused or recycled.
- C. Non-profit Donations of removed materials.

1.03 RELATED REQUIREMENTS

- A. Section 03 30 30 - Concrete Work (Patching)
- B. Section 03 81 00 - Concrete Sawcutting and Core-Drilling

1.04 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse and relocate to a storage location designated by the Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.05 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor. A demolition survey shall be completed prior to the start of construction to categorize materials schedule for removal and the proper disposal based on options described by this section.

1.06 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services. Awareness of any utility disruptions to adjacent occupied areas shall be noted.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Pre-demolition Photographs or Video: Submit before Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that

recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

- F. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.07 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.08 QUALITY ASSURANCE

- A. Specialty Removal Item: If the demolition inventory lists a specialty item for removal, Contractor shall submit certifications that the entity removing the item possess the qualifications to handle and properly dispose of scheduled materials.

1.09 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
 1. Contractor shall identify and maintain awareness of emergency shut-offs both in and adjacent to demolition areas.
 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.02 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 indicated 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. Advanced pre-approval required. Strict adherence to Saint Luke's Health System guidelines shall be followed.
 2. Arrange to shut off indicated utilities with utility companies.
 3. 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.
 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.03 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.

3.04 SELECTIVE DEMOLITION - GENERAL

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.05 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- C. Core drills in existing concrete structure: Existing utilities tie-ins require the Contractor to x-ray the existing concrete and document reinforcement found. Approval from the design team is required before making any penetrations for utility tie-ins.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.
 - 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. Saint Luke's Health System has a goal of recycling 50% of all construction debris from projects. The Contractor shall submit a recycling plan for approval by the Owner. Track and document waste streams by quantity for each material type or provide a haul ticket and summary of haul tickets to document the waste streams as sorted at a facility if materials are commingled. All proceeds from recycled materials shall be returned to the Owner.
- B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.07 CLEANING

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

3.08 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Construction to Be Removed: Refer to Drawings for extent.
- B. Existing Items to Be Removed and Salvaged: Refer to Drawings for extent.
- C. Existing Items to Be Removed and Reinstalled: Refer to Drawings for extent.
- D. Existing Items to Remain: Refer to Drawings for extent.

END OF SECTION

SECTION 03 30 30
CONCRETE WORK - PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Furnishing of all necessary materials, labor and equipment, mixing, placing and furnishing of all plain and reinforced concrete for patching of existing concrete floor slabs for Work indicated on the drawings.

1.03 RELATED REQUIREMENTS

- A. Section 03 81 00 - Concrete Sawcutting and Core-Drilling

1.04 SUBMITTALS

- A. Concrete Mix Designs: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and accessories.
 - 3. Joint-filler strips.
- C. Test Reports

1.05 QUALITY ASSURANCE

- A. Contractor shall be qualified / experienced in concrete patching of this type.
- B. Comply with governing codes and regulations.

1.06 CONCRETE TESTING

- A. Not required.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: Conforming to ASTM C150/C150M, Type I or III.
- B. Aggregates: Shall conform to the standard specifications for concrete aggregates (ASTM C33/C33M) with all subsequent amendments thereto.
 - 1. Coarse Aggregate: Clean, hard, durable, uncoated, crushed limestone conforming to the quality and gradation requirements of ASTM C33/C33M. Maximum size aggregate allowed shall be 3/4" for construction less than 6" in thickness.
 - a. Coarse Aggregate for lightweight concrete shall conform to ASTM C330/C330M.
 - 2. Fine Aggregate: Shall conform to ASTM C33/C33M.
- C. Water: Shall be clean and free from deleterious substances, oils, acids, alkalis, or organic materials.
- D. Admixtures: Not required.

2.02 GRANULAR FILL

- A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve placed below the vapor retarder.
 - 1. Install and compact at 4 inches minimum depth, unless otherwise indicated on the Drawings.

2.03 JOINTING PRODUCTS

- A. Slab Expansion and Isolation Joint Filler Strips: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
 - 1. Material: ASTM D1751, cellulose fiber.

2.04 REINFORCING

- A. All bars shall be billet steel conforming to ASTM A615/A615M, grade 60 steel for #5 bars and greater and grade 40 steel for #4 and under.
- B. Steel Welded Wire Fabric (WWF): Galvanized, plain type, ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
 - 2. WWF Style: 6 x 12-W12 x W5 (152 x 305-MW77 x MW32).
- C. Reinforcing Accessories;
 - 1. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut bars true to length with ends square and free of burrs.
 - 2. Bar Supports: Bolsters, spacers, chairs, ties, and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place shall be used according to the latest edition of the Concrete Reinforcing Steel Institute Manual.

PART 3 EXECUTION

3.01 CONCRETE QUALITY

- A. The Contractor shall guarantee concrete with the following minimums
 - 1. Cast-in-place structural concrete shall be 3,500 psi design strength using not less than 500 pounds of cement per cubic yard and not more than 6 gallons of water per 100 pounds of cement with aggregate specified.
- B. Normal Weight Concrete
 - 1. Shall be used throughout the project (structural and non-structural).
 - 2. Prior to placing any concrete, the Contractor shall submit for review by the Architect a mix design for each type of concrete proposed for use by each concrete supplier, substantiated by a laboratory report attesting to the concrete properties, including compressive strength and splitting strength.
 - 3. Upon approval, the Contractor shall not change suppliers except upon written authorization by the Architect.
- C. Mixing Concrete
 - 1. The concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.
 - 2. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94/C94M with all subsequent amendments thereto.
 - 3. Maximum Slump: 4".
- D. Placing Concrete
 - 1. Placement shall be planned well in advance so that all sections of a particular area may be poured in one continuous operation.
 - 2. Before Concrete is placed, all debris and foreign material shall be removed from the area to be poured. All reinforcing and any special metal parts or shapes shall be properly set into position.
 - 3. Transporting: Concrete shall be handled from carts, buggies, or wheelbarrows. Every possible precaution shall be taken to prevent separation or loss of the ingredients while transporting the concrete.
 - 4. Placing: Troughs, Pipes and Chutes
 - a. Concrete shall not be dropped freely a distance of more than five (5) feet.
 - b. Placing of any given section shall be done in a continuous operation.
- E. Extra water shall not be added to the concrete mix at the job site.

F. Placing Time:

1. The elapsed time between proportioning of materials, including cement, and placing of concrete in its final position shall never exceed 90 minutes.
2. Concrete shall never remain on the job site for more than 60 minutes without being placed.

3.02 BENDING AND PLACING REINFORCING STEEL

A. Cleaning and Bending Reinforcement:

1. Metal reinforcement, at the time concrete is placed shall be free from rust, scale or other coatings that will destroy or reduce the bond.
2. Bends for other bars shall be made around a pin having a diameter of not less than six times the minimum thickness of the bar except that for bars larger than 1 inch, the pin shall be not less than eight times the minimum thickness of the bar.
3. All bars shall be bent cold.

B. Placing Reinforcement:

1. Metal reinforcement shall be accurately placed in accordance with the Drawings and shall be adequately secured in position by concrete or metal chairs and spacers.

3.03 FINISHING

A. Flatwork slabs shall be poured monolithic, leveled with a straight edge screed in a sawing motion of a strike-off board.

1. Finish to match existing/adjacent concrete surfaces.
2. Interior slabs, shall be floated and finished with steel trowel.
3. Floating shall not start until water sheen has disappeared or concrete has stiffened enough to prevent excess fine material working to the surface.

3.04 TOLERANCES:

- A. Allowable tolerance from level or grade shall be 1/4" in 10 feet measured with a straight edge in any direction.

END OF SECTION

SECTION 03 81 00
CONCRETE SAWCUTTING AND CORE-DRILLING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Slab Sawing: Precision sawcutting of openings in steel-reinforced concrete floor construction.
- B. Wall Sawing (Track Sawing): Precision sawcutting of openings with precisely plumb, level or beveled edges in steel-reinforce concrete walls, masonry walls, and precast concrete wall construction.
- C. Core-Drilling: Drilling of round holes in steel-reinforced concrete, precast concrete, and masonry construction.

1.03 RELATED SECTIONS

- A. Section 02 41 00 - Selective Demolition
- B. Section 03 30 30 - Concrete Work (Patching)

1.04 REFERENCES

- A. Occupational Safety and Health Administration - Safety and Health Standards Digest Construction Industry (OSHA).
- B. ANSI B-7.1 and B-7.5 Standards.

1.05 DEFINITIONS

- A. Slab Sawing: Precision sawcutting of openings in steel-reinforced concrete floor construction.
- B. Wall Sawing (Track Sawing): Precision sawcutting of openings with precisely plumb, level or beveled edges in steel-reinforce concrete walls, masonry walls, and precast concrete wall construction.
- C. Wire Sawing: Precision sawcutting of sections of steel-reinforced concrete, precast concrete, and masonry construction to virtually any size and volume; Capable of cutting complex and irregular shapes; Capable of not over-cutting at the corners.
- D. Core-Drilling: Drilling of round holes in steel-reinforced concrete, precast concrete, and masonry construction.

1.06 PRE-JOB CONFERENCE

- A. Pre-Job Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be sawcut or core-drilled.
 - 2. Review and finalize construction schedule and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review requirements of work performed by other trades that rely on the sawcutting or core-drilling operation.
 - 4. Review areas where existing construction is to remain that requires protection from sawcutting or core-drilling operation.

1.07 SUBMITTALS

- A. Sawcutting or core-drilling procedures and operational sequence for review and acceptance.

1.08 QUALITY ASSURANCE

- A. Contractor shall be qualified/experienced in sawcutting or core-drilling materials of this type.
- B. Comply with governing codes and regulations.
- C. Contractor shall adhere to all applicable safety guidelines in accordance with Federal, State and local ordinances.

- D. Contractor shall be responsible for the design and installation of any bracing or shoring required to make sure that the material being sawed free is supported in a safe and effective manner so that when the piece is cut free, it is retained in place, causing no damage to persons, equipment or adjacent structures.

1.09 PROJECT CONDITIONS

- A. Scaffolding required by the Contractor shall be designed, provided by and erected by competent personnel according to code requirements.
- B. Shoring:
 - 1. Shore cut material to protect personnel, adjacent structures, equipment, etc.
 - 2. Shore cut material to prevent displacement upon completion of the saw cut.
- C. Provide rigging and lifting equipment and personnel to remove cut off material from the work area as soon as practical and in the safest manner possible.

1.10 COORDINATION

- A. The Contractor must determine if there are utility lines contained within, adjacent to or secured to the structure being sawcut or core-drilled.
 - 1. If utility lines are present as described, the Contractor must take the necessary action to have all services for these utilities cut off.
 - 2. If utility lines are suspected of being buried, the Contractor must call the appropriate agency for accurate utility location as state or local regulation may require.
- B. Locate existing pipe, conduit, structure, etc. prior to any sawcutting or core-drilling; interior and exterior.
- C. If an unknown utility line is unintentionally sawcut or core-drilled though, the Contractor shall immediately notify the Architect.
- D. Locate all steel reinforcement in the structure to be sawcut or core-drilled, and verify that the location of the cut lines will not split any piece of reinforcement. Propose and receive approval of an alternative cut location if required.

1.11 SAFETY REQUIREMENTS

- A. Provide adequate safety provisions to protect the operator's work area, including below, above, and adjacent to the area being cut or drilled.
- B. Provide safe access to and from the work area.
- C. Provide barricades, cones, warning tape or other devices used to keep unauthorized people out of the work area.
- D. Protect all components of the structure to remain from damage during the saw cutting operation.
- E. Provide fall protection in accordance with OSHA standard 1926.501(b)(4) for all holes and openings created by the cutting contractor.

PART 2 PRODUCTS

2.01 NOT APPLICABLE TO THIS SECTION

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not commence work until conditions are acceptable.

3.02 SLAB & WALL SAWCUTTING

Except when the contractor determines that any of the following steps do not apply to a particular work or that other steps are appropriate:

- A. Set-Up Procedures:
 - 1. Provide adequate power and water supply for equipment at time of cutting.

2. Inspect the complete saw for damage or improper functioning before cutting operations begin. Repair or replace as required.
 3. Clean and inspect the blade flanges and arbor for damage before mounting any blade. Repair or replace as required.
 4. Inspect any air, hydraulic, electric or water lines or cords attaching to the saw for proper condition and fit. Repair or replace as required.
 5. Inspect diamond blade for the condition of the segments and core. Do not use the blade if any of the following conditions exist: core cracks, missing or broken segments, loss of tension or any other condition as mentioned in the blade manufacturer's instructions.
 6. Check to confirm that the blades are of a proper specification for the material being cut.
- B. Sawing Operation:
1. When needed, place partitions or screens between wall saw operations and the personnel area to prevent any flying objects from contacting any worksite personnel.
 2. Allow no personnel to be in-line with the blade while it is rotating.
 3. On applications requiring a bottom horizontal cut, sequence the cut or shore the work piece so that the weight of the work piece is prevented from jamming, pinching and/or crushing the diamond blade.
 4. Blades and blade guards should be properly fastened to the saw as per the saw manufacturer's specifications.
 5. The saw should be operated according to the saw manufacturer's specifications.
- C. Before commencing sawing operations, determine whether the piece being removed needs to be cut into smaller, more manageable pieces.
- D. Provide temporary enclosures and/or sufficient barricades to reasonably contain slurry. Pump slurry to a suitable container during cutting operations as required.
- E. Overcutting at Corners: A determination will be made by the Architect as to whether over cuts are allowed.
- F. Tolerances: Contractor shall verify the location, dimension and accuracy of all saw cuts. Deviation of cut line or dimension of cuts by more than 1/4-inch will be repaired entirely at the Contractor's expense.

3.03 CORE-DRILLING

Except when the contractor determines that any of the following steps do not apply to a particular work or that other steps are appropriate:

- A. Set-Up Procedures:
1. Equipment used in the drilling operations must meet all OSHA standards and specifications as to plugs, noise, wiring, and fume pollution.
 2. Specifications for minimum and maximum clearance requirements between the pipe and core hole should be determined prior to starting work.
 3. Provide labor to catch core(s) and water when the core is cut free on a suspended slab.
 4. Inspect diamond core drill bits for damage to the hub area that could cause improper seating of the back of the bit against the drill shaft.
 5. Check to confirm drill bits are of proper specification for the material being cut.
 6. Prohibit access and clear machinery or equipment directly under the area to be core drilled so that falling cores do not injure any persons or damage any property.
 7. Provide fall protection for all holes or openings created by the drilling operation.
- B. Drilling Operation:
1. If any of the core drilling operations are performed without water as a coolant then additional safety precautions may apply. Consult the diamond tool manufacturer or the core drill manufacturer for specification information.
 2. If any of the core drilling operations are performed with hand held core drilling equipment then additional safety precautions may apply. Consult the core drill manufacturer for specification information.

3. Never operate a core drill assembly unattended unless the equipment has been designed specifically for this purpose.
4. The core drilling equipment should be operated in accordance with the manufacturer's specifications.
5. When needed, place partitions, barricades or caution tape around the work area to prevent unauthorized personnel from having access to the work area.

3.04 CLEANUP

- A. Provide for the proper, safe, and appropriate disposal of slurry.
- B. At completion of cutting operations and removal of cut off material wash all adjacent remaining structure clean of all slurry, collect washing and pump to a suitable container.
- C. Dispose of slurry in the proper manner off site or at the direction of the Owner on site.

END OF SECTION

SECTION 04 20 00
BRICK AND CONCRETE MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units (CMUs).
 - 2. Face brick.
 - 3. Mortar and grout.
 - 4. Reinforcing steel.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Miscellaneous masonry accessories.

1.03 RELATED REQUIREMENTS

- A. Section 04 72 00 - Cast Stone Masonry
- B. Section 05 50 00 - Metal Fabrications
- C. Section 07 21 00 - Thermal Insulation
- D. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- E. Section 07 62 00 - Sheet Metal Flashing and Trim
- F. Section 07 84 00 - Penetration Firestopping
- G. Section 07 92 00 - Joint Sealants
- H. Section 08 11 13 - Hollow Metal Doors and Frames
- I. Section 09 91 23 - Interior Painting

1.04 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.05 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.
 - 1. For Concrete Unit Masonry: $f'_m = 1500$ psi.
 - 2. For Brick Unit Masonry: $f'_m = 2500$ psi.

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
 - 3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 - 4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection: For the following:
 - 1. Decorative concrete masonry units, in the form of small-scale units.
 - 2. Face brick, in the form of straps of five or more bricks.
 - 3. Colored mortar.
 - 4. Weep holes/vents.

- D. Samples for Verification: For each type and color of the following:
 - 1. Exposed concrete masonry units.
 - 2. Face brick in the form of straps of five or more bricks.
 - 3. Special brick shapes.
 - 4. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 - 5. Stone trim.
 - 6. Weep holes/vents.
 - 7. Accessories embedded in masonry.
- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 - 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- F. Qualification Data: For testing agency.
- G. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
 - 1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
 - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - 2. Cementitious materials. Include brand, type, and name of manufacturer.
 - 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 4. Grout mixes. Include description of type and proportions of ingredients.
 - 5. Reinforcing bars.
 - 6. Joint reinforcement.
 - 7. Anchors, ties, and metal accessories.
- H. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
 - 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- I. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- J. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.07 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

1.08 MOCK-UP

- A. Locate mock-up panel where directed. Build mock-up panel facing south.
- B. Mock-up Panel Size: 6-feet long by 6-feet high by full thickness, including, but not limited to the following:
 - 1. Include a 24-inch wide by 24-inch high window opening, complete with a aluminum storefront framing and glazing.
 - 2. Include each type and brick pattern of exposed unit masonry construction typical to the exterior wall.
 - a. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
 - 3. Include weeps, a sealant-filled control joint at least 16 inches long in exterior wall mockup.
 - 4. Include upper flashing at base, drainage materials, etc., and corner of door opening framed with lintel at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - 5. Include through-wall flashing weeps, waterproofing and rigid insulation (typ. window opening) installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - 6. Clean one-half of exposed faces of panels with masonry cleaner indicated.
 - 7. Protect approved sample panels from the elements with weather-resistant membrane.
- C. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - 1. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.
- D. Demolish and remove the mock-up panel when directed.
- E. Mock-up may remain as part of the Work.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Provide shoring as required by Code or Local Authorities.
- C. Brace all walls as required.
- D. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- E. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
- F. 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 ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- G. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.03 CONCRETE MASONRY UNITS (CMU)

- A. Shapes: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners, unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for block backup on exterior walls with face brick and block walls exposed to outside air on one side and with conditioned air/office or enclosed equipment rooms on opposite side.
- C. Concrete Masonry Units: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2200 psi.

2. Weight Classification: Lightweight.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- D. Concrete Building Brick: ASTM C 55
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2500 psi.
 2. Weight Classification: Lightweight
 3. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

2.04 BRICK

- A. General:
1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 2. Size (Actual Dimensions):
 - a. Modular: 7 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
 - b. Utility: 11 5/8-inches long by 3 5/8-inches high by 3 5/8-inches deep.
 - c. Norman: 11 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
 - d. Monarch: 15 5/8-inches long by 3 5/8-inches high by 3 5/8-inches deep.
 - e. Ambassador: 15 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
- B. Face Brick, Type FB-1: ASTM C 216, Grade SW, Type FBX
1. Manufacturer/Product: Match existing building.
 2. Size: Modular.
 3. Texture: Match Existing.
 4. Color: Match Existing.
 5. Coarsing: Match Existing.
- C. Building (Common) Brick: ASTM C62, Grade SW; solid units.
1. Size: Modular.
 2. Application: Use where brick is indicated for concealed locations.

2.05 MORTAR

- A. Manufacturer:
1. Specified Manufacturer: Amerimix Companies
 - a. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1) SPEC MIX®
 - 2) The QUIKRETE Companies
 - 3) Sakrete
 - b. Substitutions: Not permitted.
- B. Cold-Weather Admixture: Cold-Weather Admixture: Non-chloride, non-corrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products of the manufacturer's listed below will be acceptable.
 - a. BASF Corporation.
 - b. Euclid Chemical Company.
 - c. W.R. Grace & Company.
- C. Pre-Blended Mortar for Unit Masonry: Factory blend of portland cement, hydrated lime, and dried sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Product: "AMX 400" as manufactured by Amerimix Companies (Oldcastle).
 - a. Type: Type N, Type S, or Type M as scheduled in this Section.
 - b. Pigment: Standard pigment color; compliant with ASTM C979.
 - 1) Color: Standard gray.

- D. Pre-Blended, Water Repellent Mortar for Unit Masonry: Factory blend of portland cement, hydrated lime, dried sand, water repellent, and proprietary admixtures; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Product: "AMX 410 WRM" as manufactured by Amerimix Companies (Oldcastle).
 - a. Description: Water-repellent mortar for use with water repellent masonry units.
 - b. Type: Type N, Type S, or Type M as scheduled in this Section.
 - c. Pigment: Standard pigment color; compliant with ASTM C979.
 - 1) Color: Standard gray.
- E. Pre-Blended Masonry Cement Mortar for Brick Masonry: Factory blend of masonry cement, dried sand, and a formulation for water retention, workability and bond strength; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Product: "AMX 500" as manufactured by Amerimix Companies (Oldcastle).
 - a. Type: Type N, Type S, or Type M as scheduled in this Section.
 - b. Pigment: Standard pigment color; compliant with ASTM C979.
 - 1) Color: To be selected by Architect from manufacturer's standard colors.
 - c. Compliance:
 - 1) Color pigment complies with ASTM C979.
 - 2) Meets ACI 530 code and ICC requirements for masonry mortars.
- F. Pre-Blended, Water Repellent Masonry Cement Mortar for Brick Masonry: Factory blend of masonry cement, sand, water repellent and proprietary admixtures; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Product: "AMX 510 WRM" as manufactured by Amerimix Companies (Oldcastle).
 - a. Type: Type N, Type S, or Type M as scheduled in this Section.
 - b. Pigment: Standard pigment color; compliant with ASTM C979.
 - 1) Color: To be selected by Architect from manufacturer's standard colors.
 - c. Compliance:
 - 1) Color pigment complies with ASTM C979.
 - 2) Meets ACI 530 code and ICC requirements for masonry mortars.

2.06 GROUT

- A. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
 - 1. Product: Amerimix; "AMX 600CG Pre-Blended Core Fill Grout - Coarse"
 - a. Type: Coarse.
 - b. Compliance:
 - 1) Meets or exceeds ASTM C476.
 - 2) Meets ACI 530 (Table 7) code and ICC requirements for masonry grout.

2.07 REINFORCED MASONRY

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; uncoated.
 - 1. Rebar Positioners: For wall width as required in hot dip galvanized finish (1.50 oz., p.s.f.) per ASTM A153/A153M - Class B-2.
 - a. Vertical Reinforcement: Hohmann & Barnard 'RB' Rebar Positioners.
 - b. Horizontal Reinforcement: Dur-o-Wall #DA-812, or approved equal.

2.08 JOINT REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Specified Manufacturer: Hohmann & Barnard, Inc (H-B)
 - 2. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.

- a. Blok-Lok Limited .
 - b. AA Wire Products.
 - c. Wire-Bond.
 - d. National Wire Products Corp.
3. Substitutions: Not permitted.
- B. General: ASTM A951/A951M.
 1. Steel Wire: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3, typical; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
- C. Single-Wythe Masonry Wall Joint Reinforcement:
 1. Ladder type:
 - a. Steel Wire: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
 - b. Application: Masonry walls with vertical reinforcement.
 - c. Product: H-B; #220 Ladder Mesh Reinforcement.
 - 1) Provide pre-fabricated corners and tees.
 2. Truss type;
 - a. Steel Wire: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
 - b. Application: Masonry walls without vertical reinforcement.
 - c. Product: H-B; #120 Truss Mesh Reinforcement.
 - 1) Provide pre-fabricates corners and tees.
- D. Multiple-Wythe Masonry Wall Joint Reinforcement (Composite Walls):
 1. Ladder type; fabricated with moisture drip.
 - a. Steel Wire: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
 - b. Product: H-B; #240 Ladder Twin-Mesh.
 - c. Application: Block-and-block composite walls.
- E. Adjustable Multiple-Wythe Masonry Wall Joint Reinforcement:
 1. Ladder type with adjustable ties or tabs spaced at 16 in (406 mm) on center and fabricated with moisture drip.
 - a. Steel Wire: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
 - b. Product: H-B; #240 Ladder Twin-Mesh.
 - c. Application: Block-and-block composite walls.
 - d. Vertical adjustment: Not less than 2 inches (50 mm).
 - e. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.
 - f. Product: H-B; #270-2X Lox-All Ladder Eye-Wire.
 - 1) Provide pre-fabricates corners and tees.
 - g. Application: Brick-and-block composite walls.
- F. Strap Anchors: Bent steel shapes configured as required for specific situations, lengths as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face; corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.
 1. Product: H-B; #344 Rigid Partition Anchor.
- G. Corrugated Wall Ties: Corrugated formed sheet metal, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1 inch (25 mm) of mortar coverage from masonry face.

1. Product: H-B; #CWT.
- H. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm).
 1. Product: H-B; #HB-213-2X Adjustable Veneer Anchor.

2.09 EMBEDDED FLASHING MATERIALS

- A. Manufacturer:
 1. Specified Manufacturer: Hyload, Inc..
 - a. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.
- B. Membrane Flexible Flashing:
 1. Product: Hyload; HyTuf, cloaked flashing system.
 2. Self-adhered Flashing Membrane with Drip Edge: Standard type, elastomeric and thermal plastic polymers combined with Dupont Elvaloy, reinforced with synthetic fibers and calendared into 40 mil thick sheets with rubberized adhesive, 1-1/2 inch sealant compatible drip edge and disposable silicone release sheet adhered to the bottom adhesive side.
 - a. Width: Provide the widths required for the detail indicated on the Drawings.
 - b. Color: Gray.
 - c. Properties:
 - 1) Elongation: ASTM D412; 225 percent, minimum.
 - 2) Tensile Strength: ASTM D412; 875 psi, minimum.
 - 3) Tear Strength: ASTM D624; 270 psi.
 - 4) Low Temperature Flexibility: ASTM D 146; minus 25 degrees F Pass.
 - 5) Water Absorption: ASTM D471; Less than 0.1 percent.
 - 6) Compatible with Urethane and Silicone sealant
 - 7) UV Stable
 3. Preformed Shapes: Hyload HyTUF Preformed Shapes are manufactured of high performance black polymeric membrane by vacuum forming or injection molding. Cloaks are one-piece construction with no seams and are provided in several shapes. Provide shapes as needed to meet Project requirements including, but not limited to the following:
 - a. Outside Corners.
 - b. Inside corners.
 - c. End Dams.
 - d. Stop Ends.
 - e. Window Seals.
 - f. Corner Caps.
 - g. Other special applications.
 4. Accessories
 - a. Primer: Hyload Hyprime Primer.
 - b. Mastic: Hyload Mastic, neoprene-based mastic used to seal top edges of membranes, membrane to membrane and membrane to Cloak laps and penetrations.
 - c. Sealant: Hyload Structural Sealant.
 - d. Membrane Adhesive: Hyload Membrane Adhesive.
 - e. Termination Bar: HyTUF Flexible Termination Bar: A Polymeric, reinforced membrane extrusion, incorporating Dupont's Elvaloy® KEE polymer extruded into a 1/4" x 1" with chamfered edges to accept sealant or mastic. Available in 25' and 50' lengths
 - f. Drip Edge: HyTUF Flexible Drip Edge: A Polymeric, reinforced membrane extruded into a 75-mil thick by 3 1/2-inch shape, with one 1/2-inch length edge that terminates at a 45-degree angle.
- C. Solder and Sealants for Sheet Metal Flashings:

1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. 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.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Manufacturers:
1. Specified Manufacturer: Hohmann & Barnard, Inc (H-B)
 2. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Blok-Lok Limited .
 - b. AA Wire Products.
 - c. Wire-Bond.
 - d. National Wire Products Corp.
 3. Substitutions: Not permitted.
- B. Compressible Filler (Soft Joints): 3/8-inch thick closed-cell Neoprene Sponge conforming to ASTM D1056, Grade 2A-1.
1. Widths as required.
 2. Product: H-B Model 'NS - Closed Cell Neoprene Sponge'.
- C. Pre-formed Control Joint/Expansion Joint Gaskets - Rubber:
1. Per ASTM D2000 M2AA-805 (Rubber Type 654-06).
 2. Widths as required.
 3. Product: H-B 'RS Series - Rubber Control Joint'.
 - a. Provide size and configuration as required for block width and joint condition.
- D. Control Joints (Fire-Rated):
1. Materials components and assemblies shall be as detailed and listed in the approved UL tested assemblies such as UL System No. WW-D-1077 for 2-hour masonry wall control joints.
- E. Pre-formed Control Joint/Expansion Joint Gaskets - PVC:
1. Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding.
 2. PVC material per ASTM D2287-684.
 3. Durometer hardness of 85, per ASTM D2240/ASTM D2240.
 4. Product: H&B 'VS Series - PVC Control Joint'.
 - a. Provide size and configuration as required for block width and joint condition.
- F. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.11 CAVITY PROTECTION

- A. Manufacturers:
1. Specified Manufacturer: Mortar Net Solutions.
 2. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Advanced Building Products, Inc.
 - b. CavClear/Archovations, Inc.
 - c. Dayton Superior Corporation.
 3. Substitutions: Not permitted.
- B. Cavity Protection: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

1. Product: MortarNet™ with Insect Barrier™.
 2. Type: Polyester mesh, 90-percent open.
 3. Configuration: Strips, full-depth of cavity and 10-inches high, with dovetail shaped notches 7-inches deep.
- C. Weep / Cavity Vents:
1. Product: Mortar Net; WeepVent™
 2. Type: Provide UV stable polyester mesh, rectangular shape, inserted in brick cavity wall open head joint.
 3. Color: Selected from manufacturer's full line.
- D. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- E. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.12 CAVITY WALL INSULATION

- A. Specified Manufacturer: Owens Corning.
1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Diversifoam Products.
 - b. Dow Chemical.
 2. Substitutions: Not permitted.
- B. Product: Owens Corning; FOAMULAR® 250, Extruded polystyrene (XPS) rigid board insulation,.
1. Type Classification: ASTM C578, Type IV.
 2. Board Thickness: As required to achieve R-value required by the 2018 IECC for continuous insulation (ci):
 - a. 2-inches thick by 16-inches wide.
 - b. Continuous Cavity Wall Insulation: R-10.
 3. Board Size: 48 by 96 inch (1220 by 2440 mm).
 4. Board Edges: Square.
- C. Physical Properties:
1. Flame Spread Index (ASTM E84): 5.
 2. Smoke Developed Index (ASTM E84): 45-175.

2.13 MASONRY CLEANERS

- A. Basis of Design Manufacturer/Products: Subject to compliance with the Contract Documents, products of the manufacturer's listed below will be acceptable.
1. ProSoCo.
 2. Sure Klean.
 3. Diedrich Technologies, Inc.
- B. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.14 LINTELS

- A. Provide precast concrete or built-in-place masonry lintels in compliance with the requirements below.
- B. Precast Concrete Lintels:
1. Construct per ASTM C1623; Concrete Compressive Strength: 3000 psi, minimum.
 2. Match adjacent CMUs in color, texture, and density.
 - a. Lintels shall be scored on each side with 3/8-inch mortar groove at 16-inches on-centers to give appearance of CMU.
 3. U-Shaped Concrete Lintels:
 - a. Sizes:

- 1) Height: 8-inches, nominal.
 - 2) Width: 6-inches, 8-inches, 10-inches, or 12-inches as required, nominal.
 - 3) Length: Per manufacturer.
- b. U-Shaped lintels shall be filled with coarse grout after installation.
- C. Built-in-Place Masonry Lintels: Constructed from bond beam CMUs matching adjacent CMUs in color, texture, density classification, and coarsing.
1. Install reinforcing bars as indicated on drawings.
 2. Lintels shall be filled with coarse grout.
 3. Temporarily support built-in-place lintels until cured.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 1. Bond: Running.
 2. Mortar Joints: Concave.
- D. Brick Units:
 1. Bond: Running.
 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
 3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches (800 mm) on center horizontally below shelf angles and lintels and near top of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch (16 mm) mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches (150 mm).
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.
- G. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches (38 mm) with at least 5/8 inch (16 mm) mortar cover to the outside face of the anchor.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- C. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.10 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as indicated on drawings.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:

1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
 2. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
 3. Anchor vertical leg of flashing into backing with a termination bar and sealant.
 4. Apply cap bead of sealant on top edge of self-adhered flashing.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.
- E. Support flexible flashings across gaps and openings.
- F. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.12 LINTELS

- A. Install loose steel lintels over openings to support brick veneer.
- B. Install reinforced unit masonry lintels over all openings unless steel or precast concrete lintels are indicated.
1. Provide reinforcing bars for masonry lintels as indicated in the structural drawings.
 2. Do not splice reinforcing bars.
 3. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
 4. Place and consolidate grout fill without displacing reinforcing.
 - a. At bearing locations, fill masonry cores with grout for a minimum 8- inches (203- mm) either side of opening.
 5. Allow masonry lintels to attain specified strength before removing temporary supports.

3.13 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.
- D. Form expansion joint as detailed on drawings.

3.14 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
1. Fill adjacent masonry cores with grout minimum 8- inches (203 mm) from framed openings.

3.15 TOLERANCES

- A. Install masonry within the site tolerances found in the current edition of TMS 402/602.

3.16 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, and sleeves, etc. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests.

- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.18 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.19 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Architectural cast stone.

1.03 RELATED REQUIREMENTS

- A. Section 04 20 00 - Brick and Concrete Masonry
- B. Section 07 92 00 - Joint Sealants

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and finishes.
- B. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- C. Mortar Color Selection Samples.
- D. Verification Samples: Pieces of actual cast stone components not less than 6 inches (152 mm) square, illustrating range of color and texture to be anticipated in components furnished for the project.
- E. Source Quality Control Test Reports.
- F. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.

1.06 WARRANTY

- A. Warranty: Submit Cast Stone Institute® Member Limited Warranty.
 - 1. Warranty Period: 10 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: Subject to compliance with the Contract Documents, products of the manufacturer's listed below will be acceptable.
 - 1. Advanced Cast Stone
 - 2. Continental Cast Stone, Inc.
 - 3. Heritage Cast Stone, Inc.
 - 4. Architect Approved equal.
 - 5. Midwest Cast Stone.
- B. Substitutions: Not permitted.

2.02 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
- B. Physical Properties:
 - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.

2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
- C. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet (6 meters).
 1. Color: Match existing.
- D. Shapes: Provide shapes indicated on drawings.
 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch (3 mm) or length divided by 360, whichever is greater, but not more than 1/4 inch (6 mm).
 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- E. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
 1. Pieces More than 24 inches (610 mm) in Any Dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

2.03 MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or III, white and/or gray.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
- E. Admixtures: ASTM C494/C494M.
- F. Water: Potable.
- G. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized.
 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- H. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- I. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- J. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
- K. Mortar: Portland cement-lime, as specified in Section 04 05 11; do not use masonry cement.
- L. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.04 MORTAR

- A. Comply with requirements in Section 04 20 00 for mortar materials and mixes.
 1. For setting mortar, use Type S
 2. For pointing mortar, use Type N
 3. 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.

2.05 SOURCE QUALITY CONTROL

- A. Test compressive strength and absorption of specimens selected at random from plant production.
 1. Test in accordance with ASTM C642.

2. Select specimens at rate of 3 per 500 cubic feet (3 per 14 cubic m), with a minimum of 3 per production week.
3. Submit reports of tests by independent testing agency, showing compliance with requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
 1. Drench cast stone components with clear, running water immediately before installation.
 2. Set units in a full bed of mortar unless otherwise indicated.
 3. Fill vertical joints with mortar.
 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.03 TOLERANCES

- A. Joints: Make all joints 3/8 inch (9.5 mm), except as otherwise detailed.
 1. Rake mortar joints 3/4 inch (19 mm) for pointing.
 2. Remove excess mortar from face of stone before pointing joints.
 3. Point joints with mortar in layers 3/8 inch (9.5 mm) thick and tool to a slight concave profile.
 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
 - b. Joints in projecting units.
 - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
 - d. Joints below lugged sills and stair treads.
 - e. Joints below ledge and relieving angles.
 - f. Joints labeled "expansion joint".
- B. Installation Tolerances:
 1. Variation from Plumb: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
 2. Variation from Level: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches (3 mm in 900 mm) or 1/4 of nominal joint width, whichever is less.
 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch (1.5 mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.04 REPAIR

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet (6 m).
- B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
- C. Repair methods and results subject to Architect's approval.

3.05 CLEANING

- A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
 1. Wet surfaces with water before applying cleaner.

2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
3. Remove cleaner promptly by rinsing thoroughly with clear water.
4. Do not use acidic cleaners.

3.06 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.

1.03 RELATED REQUIREMENTS

- A. Section 05 31 00 - Steel Decking
- B. Section 06 10 00 - Rough Carpentry
- C. Section 06 16 00 - Glass Mat Gypsum Sheathing
- D. Section 07 21 00 - Thermal Insulation
- E. Section 07 25 00 - Weather Barriers
- F. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- G. Section 07 92 00 - Joint Sealants
- H. Section 09 21 16 - Gypsum Board Assemblies
- I. Section 09 22 16 - Non-Structural Metal Framing

1.04 SUBMITTALS

- A. See Section 013300 - Submittal Procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud and ceiling joist layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Delegated Design Submittal:
 - a. Submit structural calculations prepared by manufacturer for approval. Submittal shall be sealed by a professional engineer registered in the state of Missouri.
 - b. Design Criteria:
 - 1) Engineering analysis depicting stress and deflection (stiffness) requirements for each framing application.
 - 2) Selection of framing components, accessories and welded connection requirements.
 - 3) Verification of attachments to structure and adjacent framing components.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Missouri.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3/D1.3M, "Structural Welding Code--Sheet Steel."

1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
- E. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 2. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing:

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Protect and store materials protected from exposure to rain, snow or other harmful weather conditions. Products to be handled per AISI S202 "Code of Standard Practice for Cold-Formed Steel Structural Framing."

1.07 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Products from ClarkDietrich are specified to establish a standard of quality for design, function, materials, and appearance.
- B. Other Manufacturers: The following manufacturers are approved to provide materials or products that are equivalent to the "Basis of Design":
 1. CEMCO
 2. Jaimes Industries
 3. Marino Ware
 4. R-stud, LLC
 5. SCAFCO Corporation
 6. Steel Construction Systems
 7. The Steel Network, Inc
 8. United Products, Inc.
 9. Substitutions: See Section 012500 - Substitution Procedures.
- C. Framing Connectors and Accessories:
 1. Same manufacturer as metal framing.

2.02 FRAMING SYSTEM - DESIGN DATA

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 3. Design Loads: Includes live and dead loads on floor and roofs, snow loads, and wind loads:
 - a. In accordance with applicable codes.
 - b. As indicated on the structural drawings, Sheet S1.00.
 4. Live load deflection meeting the following, unless otherwise indicated:

- a. Floors: Maximum vertical deflection under live load of 1/480 of span.
 - b. Roofs: Maximum vertical deflection under live load of 1/240 of span.
 - c. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
 - d. Design non-axial loadbearing framing to accommodate not less than 1/2 in (13 mm) vertical deflection.
5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- C. Shop fabricate framing system to the greatest extent possible.
 - D. Deliver to site in largest practical sections.

2.03 MATERIALS

- A. Cold-Formed Steel Sheet: Complying with ASTM A1003/A1003M; unless indicated otherwise.
- B. Protective Coating: CP60 coating designator minimum (G60, A60, AZ50, GF30), complying with ASTM C955 and AISI S240.
 1. Where required: CP90 coating designator minimum (G90, AZ50, GF45), complying with ASTM C955 and AISI S240.

2.04 FRAMING SYSTEM - COMPONENTS

- A. Structural Studs
 1. Basis of Design: ClarkDietrich; "Cold-Formed Steel C-Studs".
 2. Gage and Web Depth: As required to meet specified performance levels.
 3. Minimum Yield Strength: As required for design.
- B. Structural Track: Cold-formed steel track
 1. Basis of Design: ClarkDietrich; "Cold-Formed Steel Track".
 2. Web Depth: Match stud web size.
 3. Minimum Yield Strength: As required for design.
 4. Material Thickness (Gage): Match stud/joist thickness unless design dictates heavier thickness.
- C. Slotted Deflection Track
 1. Basis of Design: ClarkDietrich; "MaxTrak (SLT), MaxTrak 2D (SLT/H), or BlazeFrame DSL".
 2. Gage and Web Depth: As required to meet specified performance levels.
 3. Minimum Yield Strength: As required for design.
 4. Slotted or un-slotted.
- D. Deflection and Drift Clips
 1. Material Thickness: As required for design, based on application.
- E. Clip Angles (Support Clips)
 1. Basis of Design: ClarkDietrich; "EasyClip Series".
 2. Size and Material Thickness: As required for design, based on application.
- F. U-Channel
 1. Basis of Design: ClarkDietrich; "U-Channel and FastBridge Clip".
 2. Size and Material Thickness: As required for design.
- G. Furring Channel
 1. Basis of Design: ClarkDietrich; "Furring Channel".
 2. Size and Material Thickness: As required for design.
- H. Bridging/Spacer Bar
 1. Basis of Design: ClarkDietrich; "TradeReady Spazzer 5400 Bridging and Spacing Bar".
 2. Material Thickness: As required for design.
- I. Web Stiffeners

1. Basis of Design: ClarkDietrich; "EasyClip Quick Twist Web Stiffener".
 2. Size and Material Thickness: As required for design.
- J. Load-Bearing Headers
1. Basis of Design: ClarkDietrich; "Heavy Duty Stud (HDS) or Header Bracket (HDSC), cold-formed galvanized one-piece load-bearing header.
 2. Size and Material Thickness: As required for design.
- K. Partial Height Wall Framing
1. Basis of Design: ClarkDietrich; "Pony Wall (PW)"
 2. Material Thickness: 12 gauge, 0.0966 inch (2.45mm).
 3. Size: As required for design.
- L. Framing Component Accessories: Provide the following accessories as required for a complete system.
1. Flat strapping.
 2. Angles, plates, sheets.
 3. Custom brake-formed shapes.
- M. Fasteners: Self-drilling, self-tapping screws; Steel, complying with ASTM C 1513; Galvanized coating, plated or oil-phosphate coated complying with ASTM B 633 as needed for required corrosion resistance.
- N. Touch-Up Paint: Complying with ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings. Zinc rich, containing 95-percent metallic zinc.

2.05 FABRICATION

- A. General: Framing components may be pre-assembled into panels prior to erecting.
- B. Fabricate panels square, with components attached in a manner so as to prevent racking or distortion.
- C. Cut all framing components squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Hold members positively in place until properly fastened.
- D. Provide insulation as specified elsewhere in all double jamb studs and double header members, which will not be accessible to the insulation Subcontractor.
- E. Axially Loaded Studs:
1. Install studs to have full bearing against inside track web (1/8 inches (3.2 mm) maximum gap) prior to stud and track attachment.
 2. Splices in axially loaded studs are not permitted.
- F. Fasteners: Fasten components using self-tapping screws or welding.
- G. Welding: Welding is permitted on 18 gauge or heavier material only.
1. Specify welding configuration and size on the Structural Calculation submittal.
 2. Qualify welding operators in accordance with Section 6.0 of AWS D.1.3.
 3. Touch up all welds with zinc-rich paint in compliance with ASTM A 780.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Prior to installation, inspect previous work of all other trades. Verify that all work is complete and accurate to the point where this installation may properly proceed in strict accordance with framing shop drawings.

3.02 ERECTION

- A. General Requirements:
1. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
 2. Weld in compliance with AWS D.1.3.

3. Install in compliance with applicable sections of the AISI S240 "North American Standard for Cold-Formed Steel Structural Framing."
- B. Wall Systems:
 1. Erect framing and panels plumb, level and square in strict accordance with approved shop drawings.
 2. Handle and lift prefabricated panels in a manner so as not to cause distortion in any member.
 3. Anchor track securely to the supporting structure as shown on the erection drawings. Install concrete anchors only after full compressive strength has been achieved. Provide a sill sealer or gasket barrier between all concrete and steel connections.
 4. Butt all track joints. Securely anchor abutting pieces of track to a common structural element, or butt-weld or splice them together.
 5. Align and plumb studs, and securely attach to the flanges or webs of both upper and lower tracks except when vertical movement is specified.
 6. Install jack studs or cripples below window sills, above window and door heads, at freestanding stair rails and elsewhere to furnish support, securely attached to supporting members.
 7. Attach wall stud bridging in a manner to prevent stud rotation. Space bridging rows according to manufacturer's recommendations.
 8. Frame wall openings to include headers and supporting studs as shown in the drawings.
 9. Provide temporary bracing until erection is completed.
 10. Provide stud walls at locations indicated on plans as "shear walls" for frame stability and lateral load resistance.
 11. Where indicated in the drawings, provide for structural vertical movement using a vertical slide clip or other means in accordance with manufacturer's recommendations.

3.03 FIELD QUALITY CONTROL

- A. Inspection: Periodic special inspections are required by local code authorities.
 1. Owner will hire and pay inspection agency.
 2. Submit schedule showing when the following activities will be performed and resubmit schedule when timing changes.
 3. Inspections are required during welding operations, screw attachment, bolting, anchoring and other fastening of components within the force resisting structural system, including struts, braces, and hold-downs.

3.04 PROTECTION

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

END OF SECTION

SECTION 05 51 33
METAL LADDERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Interior metal ladders for roof hatch access.
- B. Ladder accessories.

1.03 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 72 00 - Roof Accessories

1.04 REFERENCES

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 1992.
- B. OSHA 29 CFR Standard 1910.28 - Fixed ladders; Occupational Safety and Health Standards; current edition

1.05 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Detailed drawings showing complete dimensions, all materials, mounting attachments, and fabrication details.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the engineering and manufacturing of metal ladders, with a record of successful in-service performance.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.08 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.09 WARRANTY

- A. The manufacturer shall warrant the product/s to be free of defects in material and workmanship for a period of five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Alaco Ladder Company

1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be accepted. Additional manufacturers will be considered in accordance with the "or equal" provision specified in Section 01 60 00 - Product Requirements.
 - a. O'Keeffe's, Inc.
 - b. Precision Ladders, LLC.
 - c. Royalite Manufacturing, Inc.
 - d. UPNOVR, Inc.
- B. Substitutions: Submit a request for substitution for any manufacturer not named, as specified in Section 01 25 00 - Substitution Procedures.

2.02 INTERIOR ALUMINUM LADDERS

- A. Roof Hatch Access Ladder.
 1. Basis of Design Product: Alaco; Model No.560 Fixed Wall Ladder.
 - a. Material: 6061-T6 aluminum alloy.
 - b. Ladder Width: 20-1/4 inches.
 - c. Angle of Ladder: 90-degrees.
 - d. Distance from Wall: 7-inches.
 - e. Ladder Height: Height from floor to top of roof hatch: Field verify each instance.
 - f. Finish: Mill finish.
 2. Fabrication:
 - a. Rungs: 1-1/8 inch round serrated aluminum at 12-inches on-center; secured with cast aluminum fittings to the ladder rails.
 - b. Mounting Brackets: Manufacturer's standard for mounting ladders to wall and floor.

2.03 MATERIALS

- A. Extruded Aluminum Profiles: ASTM B221, Alloy 6061-T6; standard mill finish.
- B. Aluminum Sheet and Plate: ASTM B209/ASTM B209M, Alloy 6061-T6; standard mill finish.
- C. Fasteners: Aluminum solid aircraft rivets rated at 300 lbs (1335 N) shear strength.
- D. Cast fittings, connectors and rung ends: Cast Aluminum alloy 356

2.04 FINISH

- A. Mill finish. As extruded.

2.05 ACCESSORIES

PART 3 EXECUTION

3.01 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, and in compliance with ANSI A14.3 and OSHA 1910.28.

3.04 PROTECTION

- A. Protect installed products until completion of project.

- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Non-structural dimension lumber framing.
- B. Fire retardant treated wood materials.
- C. Communications and electrical room mounting boards.
- D. Concealed wood blocking, nailers, and supports.
- E. Miscellaneous wood nailers, furring, and grounds.

1.03 RELATED REQUIREMENTS

- A. Section 07 62 00 - Sheet Metal Flashing and Trim
- B. Section 07 72 00 - Roof Accessories
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.05 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Metal framing anchors.

1.06 SUBMITTALS

- A. Product Data: Provide technical data on wood preservative materials and application instructions.

1.07 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with DOC PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - a. Factory mark each piece of lumber with grade stamp of grading agency.
 - b. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - c. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.02 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. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine; SPIB (GR).
 - 3. Spruce-pine-fir; NLGA.
 - 4. Hem-fir; WCLIB or WWPA.
 - 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - 6. Western woods; WCLIB or WWPA.
 - 7. Northern species; NLGA.
 - 8. Eastern softwoods; NeLMA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 - 1. Revise list below; usually retain all species that meet requirements except those unavailable in Project's location. Species groups below are not necessarily of equal quality even when of same grade.
 - 2. Mixed southern pine, No. 2 grade; SPIB.
 - 3. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
 - 4. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 5. Three species groups below include last two above; if retaining any of three below, delete either or both of above to eliminate duplication.

6. Eastern softwoods, No. 2 Common grade; NELMA.
 7. Northern species, No. 2 Common grade; NLGA.
 8. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.03 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.05 LOUVERED SLATWALL PANEL

- A. Provide 36" x 5/16" x 61" louvered panel w/ 1000-pound load capacity, as manufactured by AKRO-MILS and supplied by Grainger; Item #1UMD8; Mfr Model #30161.
- B. Color shall be Gray
- C. Contractor shall coordinate exact quantities based upon locations shown in the Drawings.

2.06 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 moisture, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Metal Framing: ASTM C1002 or ASTM C954, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A307/ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E488/E488M conducted by a qualified independent testing and inspecting agency.
1. Material" subparagraphs below are examples only. First subparagraph protects against corrosion in an indoor atmosphere; revise to suit other service conditions after verifying availability of thicker coatings.
 2. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
 3. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

2.07 ACCESSORIES

2.08 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
- B. Fire-Retardant-Treated Materials:
 - 1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. All interior rough carpentry items are to be fire retardant treated.
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.02 WOOD GROUND, BLOCKING AND NAILER INSTALLATION

- A. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top

story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

- B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim as indicated on the drawings, including:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Toilet accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.
 - 10. Other items indicated on drawings.

3.03 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.

3.04 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.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 15 00
PLYWOOD SHEATHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Plywood parapet sheathing
- B. Fire retardant treatment of plywood.
- C. Preservative treatment of plywood.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 06 16 00 - Glass-Mat Gypsum Sheathing

1.04 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

1.05 SUBMITTALS

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

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.
- B. Code Compliance: Comply with requirements of the following:
 - 1. International Code Council Evaluation Service, ICC-ES ESR-1785.
 - 2. Voluntary Product Standard, DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Outdoor Storage: Comply with manufacturer's recommendations:
 - 1. Set panel bundles on supports to keep off ground.
 - 2. Cover panels loosely with waterproof protective material.
 - 3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
 - 4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

1.08 WARRANTY

- A. The manufacturer shall warrant the product against material defects, or defects in manufacturing, within the specified warranty period.
 - 1. Warranty Period: Lifetime beginning at Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Products of the manufacturer's listed below will be acceptable.
 - 1. Boise Cascade Company.

2. Georgia-Pacific LLC.
3. Weyerhaeuser Company .

B. Substitutions: Not permitted.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.03 PLYWOOD PARAPET WALL SHEATHING

- A. Plywood Roof and Parapet Wall Sheathing: DOC PS 1 veneer plywood; Exterior Grade; APA Structural I; Exposure 1 sheathing
1. Thickness: 5/8-inch.
 2. Edge Profile:
 - a. Roof Sheathing: Tongue & Groove.
 - b. Parapet Wall Sheathing: Square edge.

2.04 ACCESSORIES

- A. Fasteners and Anchors: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For roof and parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or of Type 304 stainless steel.

2.05 PLYWOOD TREATMENT

- A. Factory-Treated Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire-Retardant Treatment:
1. Type: AWPA U1, Use Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; with maximum flame spread index of 25 when tested in accordance with ASTM E84 and with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
- C. Preservative Pressure Treatment:
1. Plywood: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention (to 4.0 kg/cu m retention).
 - a. Kiln dry plywood after treatment to maximum moisture content of 18 percent.
 2. Marking: Mark each piece with stamp of an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that support framing is ready to receive plywood roof and parapet wall sheathing.

3.02 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coat of preservative treatment on wood in contact with roofing and related metal flashings. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.03 PARAPET SHEATHING INSTALLATION

- A. Install sheathing on the backside of the parapet walls in accordance with manufacturer's instructions.

END OF SECTION

SECTION 06 16 00
GLASS-MAT GYPSUM SHEATHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Glass mat gypsum sheathing.

1.03 RELATED SECTIONS

- A. Section 05 40 00 - Cold-Formed Metal Framing
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 21 00 - Thermal Insulation
- D. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- E. Section 09 22 16 - Gypsum Board Assemblies

1.04 ACTION SUBMITTALS

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

1.05 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
 - 1. Preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

1.08 WARRANTY

- A. The manufacturer shall warrant the product against delamination and deterioration for exposure to normal weather conditions for a period of one (1) year from Date of Substantial Completion.
- B. The manufacturer shall warrant the product against defects in manufacturing, for a period five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Georgia-Pacific (G-P) Gypsum .
 - 1. Contacts: P: 800-225-6119 / Web: www.buildgp.com
- B. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. CertainTeed Corporation; GlasRoc.
 - 2. National Gypsum Company; Gold Bond e(2)XP.
 - 3. Temple-Inland Inc.; GreenGlass
 - 4. United States Gypsum Co.; Securock.
- C. Substitutions: Not permitted.

2.02 GLASS MAT GYPSUM WALL SHEATHING

- A. Product: DensGlass® Fireguard® Sheathing:
 - 1. Glass-Mat Gypsum Wall Sheathing: ASTM C1177/C1177M, Type X.
 - 2. Fire-Rated Assemblies: Product is UL and ULC certified as Type DGG and is included in numerous assembly designs investigated by UL and ULC for hourly fire resistance ratings.
 - 3. Thickness: 5/8-inch.
 - 4. Width (nom.): 48-inches.
 - 5. Length: 8-, 9-, or 10-feet.
 - 6. Weight: 2.5 lbs/sf.
 - 7. R-Value: 0.67.
 - 8. Physical Properties:
 - a. Compressive Strength: 500 psi (3445 kPa), minimum.
 - b. Permeance: > 17 perms.
 - c. Combustability: Product is noncombustible as described and tested in accordance with ASTM E136.
 - d. Surface Burning Characteristics: Flame spread rating: 0; smoke develop rating: 0, when tested in accordance with ASTM E84.
 - e. Air Barrier Compliance: Per the International Energy Conservation Code® (IECC), gypsum sheathing shall comply with the prescriptive code language for use as a continuous air barrier when the joints and openings are properly sealed.

2.03 FASTENERS

- A. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, according to ASTM B117
 - 1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C1002.
 - 2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
 - 3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- D. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- E. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.
- F. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- G. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent

boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- H. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
- I. Seal sheathing joints according to sheathing manufacturer's written instructions.

3.02 PROTECTION

- A. Protect glass mat-surfaced gypsum sheathing that will be exposed to weather for more than 180 days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed. Maximum exposure of assembly is 270 days prior to covering with exterior wall covering.
- B. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.

END OF SECTION

SECTION 06 61 16
SOLID SURFACE FABRICATIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Solid surface countertops.
- B. Integral solid surface sink bowls.
- C. Solid surface transaction tops.

1.03 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 - Joint Sealants
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework

1.04 SUBMITTALS

- A. Product data: Indicate product description, fabrication information and compliance with specified performance requirements.
- B. Shop Drawings: Indicate dimensions component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.
- C. Samples:
 - 1. Submit product data indicating compliance with specification requirements.
 - 2. Samples: Submit 2-inch by 2-inch samples
- D. Maintenance data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project close out documents.

1.05 QUALITY ASSURANCE

- A. Accessible Design: Comply with [the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."]

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.07 WARRANTY

- A. The manufacturer shall warrant the product/s to be free of defects in material and workmanship for a period of ten (10) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: E.I. du Pont de Nemours and Company (DuPont).
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 SOLID SURFACING FABRICATIONS

- A. Owner Standard: The solid surfacing products specified in this Section are restricted to the specified manufacturers and products unless indicated otherwise.
- B. Products: Designated in the drawings as Finish Type SS- #.

1. Type SS-1:
 - a. Product: DuPont; Corian.
 - b. Texture and Color: Clam Shell.
 - c. Thickness: 1/2-inch.
 - d. Edge Profile: Eased edge unless indicated otherwise.
 - 1) Bullnose edge at reception desk and nurses stations.
 - e. Applications:
 - 1) Countertops.
2. Type SS-2:
 - a. Product: DuPont; Corian.
 - b. Texture and Color: Bone.
 - c. Thickness: 1-1/2 inches, including 1-inch subbase.
 - d. Applications:
 - 1) Interior window sills.
 - 2) Transition between resinous flooring and LVT flooring at restrooms.
 - 3) Floor only wall base at door transition to be wrapped with resinous material.

2.03 MATERIALS

- A. Solid Surfacing Material:
 1. Composition: Homogeneous-filled plastic resin complying with ISSFA-2.
 - a. Material Thickness: 1/2-inch.
 2. Physical Properties:
 - a. Flammability: Class A, when tested to ASTM E84
 - 1) Flame Spread Index: Less than 25.
 - 2) Smoke Development Index: Less than 450.
 - b. Food Equipment Material Compliance: Food Zone to NSF 51
 - c. Tensile Strength: 6000 psi minimum, per ASTM D638
 - d. Tensile Modulus: $1.35 \times 10(6)$ psi minimum, per ASTM D638.
 - e. Tensile Elongation: 0.5% minimum, per ASTM D638.
 - f. Flexural Strength: 10000 psi minimum, per ASTM D790
 - g. Flexural Modulus: $1.34 \times 10(6)$ psi minimum, per ASTM D790.
 - h. Hardness: >85-Rockwell "M" scale minimum, per ASTM D785
 - i. Thermal Expansion: $1.8 \times 10(5)$ in./in./°F, per ASTM E228
 - j. Fungi and Bacteria: Does not support microbial growth, per ASTM G21
 - k. Microbial Resistance: Highly resistant to mold growth, per UL 2824
 - l. Ball Impact: No fracture - 1/2 lb. Ball: NEMA LD 3
- B. Medium Density Fiberboard (MDF):
 1. Composition: Lignocellulosic fibers and no-added formaldehyde synthetic resin.
 2. Standards Compliance:
 - a. ANSI A208.2 - Grade 100, balanced design.
 - b. Manufactured from recycled materials.
 - c. Meeting ANSI Standards for emissions.
 3. Fire-Retardant: MDF shall contain fire-retardant chemicals injected with raw materials during manufacturing to achieve a maximum flame-spread rating of 25, and a maximum smoke development rating of 200 when tested to ASTM E84.
- C. Moisture-Resistant MDF (MR-MDF):
 1. Uses: Where countertops receive sinks or are subjected to liquid spills.
 2. Basis of Design Product: "Medex", as manufactured by Roseburg Forest Products Company, or equivalent.
 - a. Standards Compliance:
 - 1) ANSI A208.2 - Grade 155; MR50.
 - 2) ASTM D1037: Passed.
 - 3) ASTM E84, Class C flame spread rating.
 - b. Density: 48 pcf, minimum.

- D. Integral Sinks: Refer to "Solid Surface Sinks" Article this Section.
- E. Adhesives and Sealant: Refer to "Installation Accessories" Article this Section.

2.04 SOLID SURFACE COUNTERTOPS

- A. Countertops shall be built-up with 1/2-inch thick solid surface sheet over a 1-inch thick sub-top, for a total thickness of 1-1/2 inches.
 - 1. Sub-Top Material: MDF and/or MR-MDF.
- B. Construction:
 - 1. Depth: As indicated on the Drawings. Countertops requiring compliance with ADA shall have a maximum depth of 24-inches (600-mm) from the farthest most projection of cabinetry to the face of back wall.
 - a. ADA Compliant Countertops shall have a maximum depth of 24-inches (600-mm), measured from the farthest most projection of cabinetry to the face of back wall.
 - 2. Edge Thickness: 1-1/2 inches.
 - 3. Edge Profile: Eased edge.
 - 4. Overhang: 1-inch (25-mm) beyond face of base cabinets.
 - 5. Open End Radii: Countertops with open ends shall have a 1 1/2-inch radius at the open end between the front and end faces.
- C. Splashes (Back- and End-)
 - 1. Material and Color: Match countertops.
 - 2. Height: 4-inches high, typical.
 - 3. Thickness: 1/2-inch (12-mm).
 - 4. Splash Type:
 - a. Shop-formed integral splashes with coved assembly between horizontal and vertical surfaces.
 - 1) Coved strip assembly shall be recessed into the deck 3-mm to eliminate 'feather' at glue line.
 - 2) Provide a formed scribe strip at top of splash to permit scribing to wall surface.
 - 3) L-Shaped Returns: Shop-fabricated inside corner cove.
- D. Integral Sinks: Refer to "Solid Surface Sinks" Article this Section.

2.05 SOLID SURFACE WINDOW SILLS

- A. Solid Surface Material Type: As scheduled.
- B. Construction: Built-up of 1/2-inch thick solid surface sheet materials over a 1-inch substrate, for a total thickness of 1-1/2 inch.
 - 1. Adhesively joined with inconspicuous seams.
 - 2. Edges: Eased Edges.

2.06 INTEGRAL SOLID SURFACE SINKS

- A. Solid Surface Sinks:
 - 1. Products: Corian Solid Surface Acrylic Sinks, as manufactured by DuPont.
 - a. Description: Injection molded and specially shaped solid surface products commonly used as counter sinks, kitchen sinks, and lavatory bowls.
 - b. Composition: Solid Surface Sinks and Bowls are composed of a proprietary acrylic resin and minerals, are completely homogeneous, and the color has a uniform pigment throughout the thickness of each bowl.
 - c. Sizes: As scheduled below.
 - d. Color: Bone.
- B. Mounting of Sinks to Countertop:
 - 1. Hard Seam Undermount Installation: Where the edge of the deck and the sink bowl are flush, and the sink bowl is attached to the deck with adhesive.
 - a. Rout the cutout for the sink in the countertop.
 - b. Adhere bowl positioning blocks into position against the bowl with hot-melt adhesive.
 - c. Adhere undermount sink to countertop using manufacturer's recommended adhesive.

- d. Use clamping devices to hold bowl until adhesive sets.
- C. Integral Solid Surface Sinks: Finish Type IS- #, as specified below.
- D. Lavatory Sink Bowls:
 - 1. Product: DuPont "Corian" Lavatory Sink Bowl:
 - 2. Type IS-2: Model No. 820P: 14-3/4 inch length by 10-1/2 inch width by 5-1/2 inch depth (inside sink dimensions), Oval, ADA compliant.
- E. Countertop Sinks, Single Basin:
 - 1. Product: DuPont; "Corian" Countertop Sink, single bowl:
 - a. Type IS-1: Model No. 804: 15-3/4 inch length by 15-3/4 inches width by 8-1/8 inch depth (inside sink dimensions)

2.07 INSTALLATION MATERIALS

- A. Mounting Adhesive: Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
 - 1. Provide spacers, if required, of type recommended by adhesive manufacturer.
- B. Joint Adhesive: Methacrylate-based adhesive for chemically bonding solid surfacing seams. Color complementary to solid surfacing sheet material. UL 2818 GREENGUARD Gold certified and complying with SCAQMD Rule 1168.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
- C. Elastomeric Joint Sealant (Silicone): Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications. Complies with ASTM C920, Type S (single component), Grade NS (nonsag).
 - 1. Color: Complementary to solid surfacing color.
- D. Siliconized Acrylic Joint Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates. Complies with ASTM C384, Type OP, Grade NF, and SCAQMD Rule 1168.
 - 1. Color: Complementary to quartz surfacing color.
- E. Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.
- F. Solvent: Product recommended by adhesive manufacturer to clean surface of solid surfacing to assure adhesion of adhesives and sealants.
- G. Cleaning Agents: Non-abrasive, low pH cleansers.

2.08 FABRICATION

- A. Assemble work at shop following manufacturer's printed fabrication instructions and deliver to job ready for installation. Manufacture in largest practical pieces for handling and shipping without seams.
 - 1. Grade: AWI, Premium.
 - 2. Fabricate tops with shop-applied edges, backsplashes, and endsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 3. Joints: Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
 - 4. Cut and finish component edges with clean sharp returns. Route radius and contours to template. Repair or reject defective and inaccurate work.
 - 5. Do not exceed manufacturer's recommended unsupported overhang distances.
 - 6. Integral Sinks: Refer to "Solid Surface Sinks" Article this Section.
 - 7. Provide cut-outs for plumbing fixtures and trim, washroom accessories, appliances, and related items. Confirm layout with manufacturer's cut-out templates before beginning work. Round corners of cut-outs and sand edges smooth.
 - 8. Recess and conceal fasteners, connections, and reinforcing.
 - 9. Radius corners and edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine walls and other surrounding construction prior to installation of solid surface fabrications.
 - 1. Verify that construction complies with indicated requirements of construction documents regarding size, configuration and other requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- D. Adhere undermount mount sinks to countertops using manufacturer's recommended adhesive and mounting hardware.
- E. Seal between wall and components with joint sealant.

3.03 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.04 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.05 PROTECTION

- A. DO NOT stand on the installed countertops for any reason.
- B. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- C. Protect surfaces from damage until Date of Substantial Completion.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Rigid foam board insulation.
- B. Acoustical blanket insulation.
- C. Fiberglass blanket insulation.
- D. Mineral wool insulation.
- E. Fire safing insulation.

1.03 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 04 20 00 - Brick and Concrete Masonry
- C. Section 05 40 00 - Cold-Formed Metal Framing
- D. Section 06 10 00 - Rough Carpentry
- E. Section 07 24 00 - EIFS
- F. Section 07 54 23 - TPO Single-Ply Roofing System
- G. Section 09 21 16 - Gypsum Board Assemblies
- H. Section 09 22 16 - Non-Structural Metal Framing

1.04 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- C. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES

1.05 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Retain paragraph below for foam-plastic board insulation.
- C. Protect foam-plastic insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of concealment.
 - 2. Protect against ignition at all times.
 - 3. Quickly complete concealment of foam-plastic insulation in each area of construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Owens Corning Insulating Systems, LLC unless noted otherwise.
 - 1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.

- a. Dow Chemical Company.
- b. DiversiFoam Products.
- c. Certain Teed Corporation.
- d. ACH Foam Technologies, LLC.
- e. Knauf Insulation.
- f. Rockwool.
- g. InsulFoam LLC (Carlisle)
- h. Kingspan Insulation, LLC

2.02 APPLICATIONS

- A. Below Grade Insulation:
 1. Under-Slab and Perimeter Foundation Insulation: Extruded polystyrene rigid board.
 2. Continuous Insulation over Concrete Walls: Expanded polystyrene rigid board.
 3. Insulation on Inside of Concrete and Masonry Exterior Walls: Fiber board.
 4. Waterproofing Protection Barrier: Expanded polystyrene rigid board. Refer to Section 07 13 00
- B. Cavity Wall Construction:
 1. Masonry Cavity Wall Insulation: Refer to Section 04 20 00.
- C. Metal-Framed Exterior Wall Construction:
 1. Stud Cavity Insulation: Fiberglass batt insulation, faced or unfaced.
 2. Continuous Insulation: Extruded polystyrene rigid board over wall sheathing.
- D. Metal-Framed Interior Wall Construction:
 1. Stud Cavity Insulation: Sound attenuation batt insulation, unfaced.
- E. Insulation Over Roof Deck: Polyisocyanurate board.

2.03 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.
 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 3. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
 4. Board Thickness: 1-1/2 inch (38 mm).
 5. Board Edges: Square.
 6. Type and Compressive Resistance: Type XI, 5 psi (35 kPa), minimum.
 7. Type and Thermal Resistance, R-value (RSI-value): Type XI, 3.1 (0.55) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
- B. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 2. Flame Spread Index (FSI): Class B - 26 to 75, when tested in accordance with ASTM E84.
 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
 5. Board Edges: Square.
 6. Manufacturers:
 - a. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
- C. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.

5. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
 6. Board Thickness: 1-3/4 inch (44.5 mm).
 7. Board Edges: Shiplap, at long edges.
 8. Manufacturers:
 - a. Dow Chemical Company; STYROFOAM Brand Ultra SL (Shiplap):
www.dowbuildingsolutions.com/#sle.
- D. Extruded Polystyrene (XPS) Cavity Wall Insulation Board: Complies with ASTM C578, and manufactured using carbon black technology.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 3. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
 4. Board Size: 15-3/4 inch by 96 inch (400 mm by 2440 mm).
 5. Board Thickness: 1-3/4 inch (44.5 mm).
 6. Board Edges: Square.
 7. Manufacturers:
 - a. Dow Chemical Company; STYROFOAM Brand CAVITYMATE Ultra:
www.dowbuildingsolutions.com/#sle.

2.04 FIBERBOARD INSULATION MATERIALS

2.05 BLANKET (BATT) INSULATION MATERIALS

- A. Glass-Fiber Blanket Insulation
1. Manufacturer: Owens Corning Insulating Systems, LLC.
 2. Glass-Fiber Blanket (Batt) Insulation, General:
 - a. Insulation Width: Where indicated, provide 16-inch batts to fit stud spacing.
 - b. Insulation Length: 48-inches or 96-inches.
 - c. Facings:
 - 1) Plenum Space: Where indicated, provide Aluminum foil, one side.
 - 2) Non-Plenum Spaces: Where indicated, provide Asphalt treated Kraft paper, one side.
 - d. Formaldehyde Content: Zero.
 - e. Corrosiveness (ASTM C665): Passes.
 - f. Fungi Resistance (ASTM C1338): Passes.
 3. Products:
 - a. EcoTouch® Unfaced Thermal Batt Insulation: ASTM C665, Type I, preformed formaldehyde free glass fiber batt type, unfaced.
 - 1) Physical Properties:
 - (a) Combustibility (ASTM E136): Non-combustible.
 - (b) Mold/mildew resistant per ASTM C138/C138M.
 - (c) Surface Burning Characteristics (ASTM E84): Flame Spread: 10; Smoke Developed Index: 10.
- B. Acoustic Blanket Insulation (Sound Attenuation Batts)
1. Manufacturer: Owens Corning Insulating Systems, LLC.
 2. Product: EcoTouch® Unfaced Sound Attenuation Batts (SABs).
 - a. Type: Unfaced glass fiber acoustical insulation, complying with ASTM C665, Type I.
 - b. Fire-Resistance: When installed in wall systems and tested per ASTM E119, assembly fire-resistance ratings up to 2-hours can be achieved.
 - c. Insulation Thickness: 3-1/2 inches thick.
 - d. Insulation Width: Provide 16-inch wide batts to fit stud spacing, unless noted otherwise.
 - e. Insulation Length: 96-inches.

2.06 ACCESSORIES

- A. Insulation Fasteners

1. Secure friction fit batts with duct tape until gypsum boards are installed.
2. Install galvanized chicken wire fastened to studs at areas where insulation is to be left exposed in metal studs, to secure in place, on both sides if necessary.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically with impaling strips, per manufacturers instructions.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.03 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 24 00
EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 GENERAL

1.01 SUMMARY

- A. Provide EIFS with Air and Moisture Barrier for vertical above grade exterior wall substrate surfaces.
- B. Related Sections :
 - 1. Sheathing
 - 2. Vapor Retarders
 - 3. Air Barriers
 - 4. Sheet Metal Flashing and Trim
 - 5. Sealants and Caulking
 - 6. Exterior Entrance Doors
 - 7. Exterior Windows/Curtain Wall

1.02 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data.
- B. Manufacturer's code compliance report.
- C. Manufacturer's standard warranty.
- D. Applicator's certificate of instruction.
- E. Samples for approval as directed by architect or owner.
- F. EPS board manufacturer's certificate of compliance with ASTM E 2430
- G. Sealant manufacturer's certificate of compliance with ASTM C 1382.
- H. Prepare and submit project-specific details (when required by contract documents).

1.03 DESIGN REQUIREMENTS

- A. Wind Load
 - 1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
 - 2. Design for wind load in conformance with code requirements.
- B. Moisture Control
 - 1. Prevent the accumulation of water behind the EIF system, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly.
 - a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
 - b. Air Leakage Prevention-- provide continuity of air barrier system at foundation, roof, windows, doors and other penetrations through the system with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
 - c. Vapor Diffusion and Condensation-- perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation. Adjust insulation thickness and/or other wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.
 - d. Impact Resistance
 - 2. Provide ultra-high impact resistance to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Indicate the areas with impact resistance other than "Standard" on contract drawings.

C. Color Selection:

1. Select finish coat with a light reflectance value of 20 or greater. (The use of dark colors is not recommended with EIF Systems that incorporate expanded polystyrene [EPS]. EPS has a service temperature limitation of approximately 160° F [71°C]). Color shall be from Manufacturers Standard Selection of colors and finishes.

D. Joints

1. Design minimum 3/4 inch (19 mm) wide expansion joints in the EIFS where they exist in the substrate or supporting construction, where the EIFS adjoins dissimilar construction or materials, at changes in building height, and at floor lines in multi-level wood frame construction.
2. Design minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (windows, doors, etc.).
3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, "Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish System (EIFS) Joints," and that meets minimum 50% elongation after conditioning.
4. Design joints so that Air Barrier continuity is maintained across the joint and drain joints to the exterior.

E. Grade Condition

1. Do not specify EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 6 inch (152 mm) clearance above finished grade as required by code.

F. Trim, Projecting Architectural Features and Reveals

1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of EIFS on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance. Refer to Sto details 1.04a and 1.04b.
2. Do not use EIFS on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto detail 10.61.

G. Insulation Thickness

1. Minimum EPS insulation thickness is 1 inch (25 mm).
2. Maximum EPS insulation thickness is 12 inches (305 mm) when installed in accordance with ESR-1748 (including architectural features).

H. Fire Protection

1. Do not use foam plastic in excess of 12 inches (305 mm) thick on noncombustible type construction unless approved by the code official.
2. Where a fire-resistance rating is required by code use EIFS over rated assembly (EIFS is considered to not add or detract from the fire-resistance of the rated assembly).
3. Refer to manufacturer's applicable code compliance report for other limitations that may apply.

1.04 PERFORMANCE REQUIREMENTS

A. TABLE 1 - AIR/MOISTURE BARRIER PERFORMANCE

TEST	METHOD	CRITERIA	RESULT

1. WATER PENETRATION RESISTANCE	AATCC 127 (WATER COLUMN)	RESIST 21.6 IN (55 CM) WATER FOR 5 HOURS BEFORE AND AFTER AGING	PASS
2. WATER PENETRATION RESISTANCE AFTER CYCLIC WIND LOADING	ASTM E 1233 / ASTM E 331	NO WATER AT EXTERIOR PLANE OF SHEATHING AFTER 10 CYCLES @ 80% DESIGN LOAD AND 75 MINUTES WATER SPRAY AT 6.24 PSF (299 PA) DIFFERENTIAL	NO WATER PENETRATION ON PLYWOOD, OSB, AND GLASS MAT FACED GYPSUM SHEATHINGS
3. WATER RESISTANCE TESTING	ASTM D 2247	ABSENCE OF DELETERIOUS EFFECTS AFTER 14 DAY EXPOSURE	NO DELETERIOUS EFFECTS
4. WATER VAPOR TRANSMISSION	ASTM E 96 METHOD B (WATER METHOD)	MEASURE	STO GOLD FILL®*: 17.3 PERMS [994 NG/(PA·S·M ²)]
5. AIR LEAKAGE	ASTM E 283	<0.06 CFM/FT ² (0.00030M ³ /S·M ²)	<0.0044 CFM/FT ² (0.000022 M ³ /S·M ²)
6. STRUCTURAL INTEGRITY	ASTM E 330	2-INCHES (51 MM) H ₂ O PRESSURE (POSITIVE & NEGATIVE) FOR 1 HOUR.	PASS
7. DRY TENSILE STRENGTH	ASTM D 882	20 LBS/IN (3503 N/M), MINIMUM BEFORE AND AFTER AGING	STO GOLD FILL:* 159 LBS/IN (27845 N/M)) BEFORE AGING 213 LBS/IN (37302 N/M) AFTER AGING
8. PLIABILITY	ASTM D 522	NO CRACKING OR DELAMINATION USING 3" (3 MM) MANDREL AT 14°F (-10°C) BEFORE AND AFTER AGING	PASS
9. SURFACE BURNING	ASTM E 84	FLAME SPREAD 0 – 25 FOR NFPA CLASS A, UBC CLASS I	FLAME SPREAD: 5 SMOKE DENSITY: 10
10. TENSILE ADHESION	ASTM C 297	>15 PSI (103 KPA)	>30 PSI (207 KPA) TO PLYWOOD, OSB, GLASS MAT FACED GYPSUM SHEATHINGS

A. Table 2-EIFS Weather Resistance and Durability Performance

TEST	METHOD	CRITERIA	RESULTS
1. ACCELERATED WEATHERING	ASTM G 153 (FORMERLY ASTM G 23)	NO DELETERIOUS EFFECTS* AT 2000 HOURS WHEN VIEWED UNDER 5X MAGNIFICATION	PASS @ 2000
2. ACCELERATED WEATHERING	ASTM G 154 (FORMERLY ASTM G 53)	NO DELETERIOUS EFFECTS* AT 2000 HOURS WHEN VIEWED UNDER 5X MAGNIFICATION	PASS @ 4000 HOURS

3. FREEZE/THAW RESISTANCE	ASTM E 2485	NO DELETERIOUS EFFECTS* AT 10 CYCLES WHEN VIEWED UNDER 5X MAGNIFICATION	PASS @ 90 CYCLES
4. WATER PENETRATION	ASTM E 331 (MODIFIED PER ICC-ES AC 235)	NO WATER PENETRATION BEYOND THE PLANE OF THE BASE COAT/EPS BOARD INTERFACE AFTER 15 MINUTES AT 6.24 PSF (299 PA) OR 20% OF DESIGN WIND PRESSURE, WHICHEVER IS GREATER	PASS AT 12.0 PSF (575 PA) AFTER 30 MINUTES
5. DRAINAGE EFFICIENCY	ASTM E 2273	90% MINIMUM	> 99%
6. TENSILE ADHESION	ASTM E 2134	MINIMUM 15 PSI (103KPA) TENSILE STRENGTH	PASS
7. WATER RESISTANCE	ASTM D 2247	NO DELETERIOUS EFFECTS* AT 14 DAY EXPOSURE	PASS @ 28 DAYS
8. SALT SPRAY	ASTM B 117	NO DELETERIOUS EFFECTS* AT 300 HOURS	PASS @ 500 HRS
9. ABRASION RESISTANCE	ASTM D 968	NO CRACKING OR LOSS OF FILM INTEGRITY AT 528 QUARTS (500 L) OF SAND	PASS @ 1057 QUARTS (1000 L)*
10. MILDEW RESISTANCE	ASTM D 3273	NO GROWTH SUPPORTED DURING 28 DAY EXPOSURE PERIOD	PASS @ 42 DAYS
11. IMPACT RESISTANCE	ASTM E 2486	LEVEL 1: 25-49 IN-LBS (2.83-5.54J) LEVEL 2: 50-89 IN-LBS (5.65-10.1J) LEVEL 3: 90-150 IN-LBS (10.2-17J) LEVEL 4: >150 IN-LBS (>17J)	PASS WITH ONE LAYER STO MESH PASS WITH TWO LAYERS STO MESH PASS WITH ONE LAYER STO INTERMEDIATE MESH PASS WITH ONE LAYER STO ARMOR MAT AND ONE LAYER STO MESH

A. Table 3-EIFS and Air/Moisture Barrier Fire Performance

TEST	METHOD	CRITERIA	RESULT
1. FIRE ENDURANCE	ASTM E 119	MAINTAIN FIRE RESISTANCE OF EXISTING RATED ASSEMBLY	PASS*

2. INTERMEDIATE SCALE MULTI-STORY FIRE TEST	NFPA 285 (UBC STANDARD 26-9)	1. RESISTANCE TO VERTICAL SPREAD OF FLAME WITHIN THE CORE OF THE PANEL FROM ONE STORY TO THE NEXT 2. RESISTANCE TO FLAME PROPAGATION OVER THE EXTERIOR SURFACE 3. RESISTANCE TO VERTICAL SPREAD OF FLAME OVER THE INTERIOR SURFACE FROM ONE STORY TO THE NEXT 4. RESISTANCE TO SIGNIFICANT LATERAL SPREAD OF FLAME FROM THE COMPARTMENT OF FIRE ORIGIN TO ADJACENT SPACES	PASS WITH 12 INCHES OF EPS INSULATION *
3. RADIANT HEAT IGNITION	NFPA 268	NO IGNITION @ 20 MINUTES	PASS WITH 12 INCHES OF EPS INSULATION
4. SURFACE BURNING (INDIVIDUAL COMPONENTS)	ASTM E 84	INDIVIDUAL COMPONENTS SHALL EACH HAVE A FLAME SPREAD OF 25 OR LESS, AND SMOKE DEVELOPED OF 450 OR LESS	FLAME: 0 SMOKE DEVELOPED: 5

A. Table 4-EIFS Component Performance

TEST	METHOD	CRITERIA	RESULT
1. ALKALI RESISTANCE OF REINFORCING MESH	ASTM E 2098	GREATER THAN 120 PLI (21 DN/CM) RETAINED TENSILE STRENGTH	PASS
2. REQUIREMENTS FOR RIGID PVC ACCESSORIES	ASTM D 1784	MEETS CELL CLASSIFICATION 13244C	PASS

1.05 QUALITY ASSURANCE

A. Manufacturer requirements

1. Member in good standing of the EIFS Industry Members Association (EIMA).
2. System manufacturer for a minimum of twenty-five (25) years.
3. Manufacturing facilities ISO 9001:2000 Certified Quality System.
4. Manufacturer's wall assembly listed in Gypsum Association Fire Resistance Design Manual.

B. Contractor requirements

1. Engaged in application of EIFS for a minimum of three (3) years.
2. Knowledgeable in the proper use and handling of Sto materials, possessing certificate of completion for Sto on-line applicator test.
3. Employ skilled mechanics who are experienced and knowledgeable in EIFS application, and familiar with the requirements of the specified work.

4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
 5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.
- C. Insulation board manufacturer requirements
1. Recognized by Sto as capable of producing insulation board to meet system requirements, and hold a valid licensing agreement with Sto.
 2. Listed by an approved agency.
 3. Label insulation board with information required by Sto, the approved listing agency and the applicable building code.
- D. Mock-up Testing
1. Construct full-scale mock-up of typical EIFS/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, E 331 and E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.
- E. Inspections
1. Provide independent third party inspection where required by code or contract documents.
 2. Conduct inspections in accordance with code requirements and contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
- C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.07 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24 hours after application of Air/Moisture barrier and EIFS.
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.08 COORDINATION/SCHEDULING

- A. Provide site grading such that EIFS terminates above finished grade a minimum of 6 inches (150 mm) or as required by code.
- B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air and moisture barrier.
- C. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- D. Coordinate installation of windows and doors so air barrier components are connected to them to provide a continuous air barrier.
- E. Install window and door head flashing immediately after windows and doors are installed.
- F. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
- G. Install copings and sealant immediately after installation of the EIF system and when EIFS coatings are dry.

- H. Attach penetrations through EIFS to structural support and provide water tight seal at penetrations.

1.09 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide Air/Moisture Barrier, EIF System and accessories from single source manufacturer or approved supplier.
- B. The following are acceptable manufacturers:
 - 1. Sto Corp.; Air/Moisture Barrier, EIF System
 - 2. Dryvit; Air/Moisture Barrier, EIF System
 - 3. Plastic Components, Inc.; Accessories

2.02 AIR/MOISTURE BARRIER

- A. StoGuard™
 - 1. Joint Compound: Sto Gold Fill-ready mixed flexible joint compound for rough opening protection and joint treatment of wall sheathing (not required for concrete/masonry surfaces).
 - 2. Waterproof Coating: Sto Gold Coat®-ready mixed waterproof coating for wall substrates and sheathings.

2.03 ADHESIVE

- A. Cementitious Adhesives
 - 1. Sto BTS® Plus-one-component, polymer-modified, cement based high build adhesive (for use over exterior glass mat faced gypsum sheathing (compliant with ASTM C 1177), exterior cementitious sheathing, concrete, masonry or cement plaster surfaces. Also used over exterior or Exposure I OSB and plywood sheathing when protected with StoGuard).

2.04 INSULATION BOARD

- A. Nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E 2430 and ASTM C 578 Type I requirements.

2.05 BASE COAT

- A. Cementitious Base Coat
 - 1. Sto BTS Plus

2.06 REINFORCING MESHES

- A. Standard Mesh
 - 1. Sto Mesh--nominal 4.5 oz./yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials.
- B. Specialty Meshes
 - 1. Sto Detail Mesh--nominal 4.2 oz./yd² (143 g/m²), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials.

2.07 PRIMER

- A. Sto Primer Sand - acrylic based tintable primer with sand for roller application.
- B. Sto Primer Smooth - acrylic based tintable primer for spray application.

2.08 FINISH COAT

- A. Stolit®-acrylic based textured wall coating with graded marble aggregate.

2.09 JOB MIXED INGREDIENTS

- A. Water--Clean and potable.
- B. Portland cement--Type I, Type II, or Type I-II in conformance with ASTM C 150.

2.10 ACCESSORIES

- A. Starter Track: Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., 9051 NW 97th Terrace, Miami, Florida 33178 (800 327-7077) or equivalent.

2.11 MIXING

- A. Sto Gold Fill - mix with a clean, rust-free high speed mixer to a uniform consistency.
- B. Sto Gold Coat - mix with a clean, rust-free high speed mixer to a uniform consistency.
- C. Sto BTS Plus - mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 47 pound (21.3 kg) bag of Sto BTS Plus. Pour water into a clean mixing pail. Add Sto BTS Plus, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Plus or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum water amount in mix ratio.
- D. Stolit - mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture
- E. Mix only as much material as can readily be used.
- F. Do not use anti-freeze compounds or other additives.

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (section 1.06 B).

3.02 EXAMINATION

- A. Inspect surfaces for:
 - 1. Contamination-algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
 - 2. Surface absorption and chalkiness.
 - 3. Cracks-measure crack width and record location of cracks.
 - 4. Damage and deterioration.
 - 5. Moisture content and moisture damage-use a moisture meter to determine if the surface is dry enough to receive the EIFS and record any areas of moisture damage.
 - 6. Compliance with specification tolerances-record areas that are out of tolerance (greater than 1/4-inch in 8-feet [6mm in 2438 mm] deviation in plane).
- B. Inspect sheathing application for compliance with applicable requirement:
 - 1. Glass Mat Faced gypsum sheathing compliant with ASTM C 1177.
 - 2. Exterior Grade and Exposure I wood based sheathing-APA Engineered Wood Association E 30
 - 3. Cementitious sheathing--Consult manufacturer's published recommendations
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and EIFS installation to the General Contractor. Do not start work until deviations are corrected.

3.03 SURFACE PREPARATION

- A. Remove surface contaminants on concrete and concrete masonry surfaces.
- B. Apply conditioner by sprayer or roller to chalking or excessively absorptive surfaces.
- C. Replace weather-damaged sheathing and repair damaged or cracked surfaces.
- D. Level surfaces to comply with required tolerances.
- E. Repair cracks, spalls or damage in concrete or concrete masonry surfaces.

3.04 INSTALLATION

- A. Air/Moisture Barrier

1. For installation over exterior or Exposure I Plywood, and Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177:
 - a. Protect rough openings, joints and parapets: apply Sto Gold Fill joint compound by trowel over rough openings, sheathing joints, inside and outside corners, and tops of parapets. Immediately embed reinforcing mesh in the wet joint compound and trowel smooth. Embed minimum 4 inch (101 mm) wide mesh at sheathing joints and minimum 9 inch (152 mm) wide mesh at rough openings, inside and outside corners and tops of parapets (refer to Sto detail 10.23a for detailed information on proper protection of rough openings and sequencing of work at rough openings).
 - b. Spot fasteners with Sto Gold Fill joint compound.
 - c. Apply waterproof coating by roller over sheathing surface, including the dry joint compound, to a uniform wet mil thickness of 10 mils in one coat and up to a total dry mil thickness of 30 mils. Use ½ inch (13 mm) nap roller for plywood and gypsum sheathing. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.
 - d. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
 - e. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
 2. For Installation over Concrete or Concrete Masonry Unit (CMU) surfaces:
 - a. Repair cracks up to 1/8 inch (3 mm) wide with Sto Gold Fill. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oil-free compressed air. Apply Sto Gold Fill by spray, trowel or putty knife over the crack and tool surface smooth. For cracks wider than 1/8 inch (3mm) up to ¼ inch (6mm) wide, use a paintable acrylic latex caulk to fill crack, tool flush, and allow to dry. Protect repair from weather until dry.
 - b. Liberally apply two coats of Sto Gold Coat to the surface with a ¾ inch nap roller or spray equipment to a minimum wet thickness of 10 mils each and up to a total maximum of 30 dry mils depending on surface condition. Additional coats may be necessary to provide a void and pinhole free surface. Protect from weather until dry.
 - c. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
 - d. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
- B. Starter Track
1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
 2. Attach the starter track even with the line into the structure a maximum of 16 inches (406 mm) on center with the proper fastener: Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) penetration, and galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration. Attach between studs into blocking as needed to secure the track flat against the wall surface. For solid wood sheathing or concrete/masonry surfaces, attach directly at 12 inches (305 mm) on center maximum.
 3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS Board to be seated inside of track) and abut.
 4. Install Starter Track at other EIF System terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing.
- C. Splice Strips for Starter Track and Flashing

1. Starter Track, Window/Door Head Flashing and Side Wall Step Flashing: install 2 inch (51 mm) wide diagonal splice strips of detail mesh at ends of head flashings. Install minimum 4 inch (100 mm) wide splice strips of detail mesh between back flange of starter track, head flashings and roof/side wall step flashing. Center the mesh so it spans evenly between the back flange of the Starter Track or flashing and the sheathing. Embed the mesh in the wet joint compound and trowel smooth.
 2. Apply waterproof coating over the splice strip when the joint compound is dry (refer to Sto Details 10.00 and 10.23b).
- D. Backwrapping
1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2 ½ inches (64 mm) on the outside surface of the insulation board. Adhere mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed (paragraph I.1). Alternatively, pre-wrap terminating edges of insulation board.
- E. Adhesive Application and Installation of Insulation Board.
1. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. (Note: rasping prevents an outward bow at the Starter Track).
 2. Apply adhesive to the back of the insulation board with the proper size stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge.
 3. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.
 4. Butt all board joints tightly together to eliminate any thermal breaks in the EIFS. Care must be taken to prevent any adhesive from getting between the joints of the boards.
 5. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.
 6. Remove individual boards periodically while the adhesive is still wet to check for satisfactory contact with the substrate and the back of the insulation board, and for spacing between ribbons of adhesive. An equal amount of adhesive must be on the substrate and the board when they are removed, as an indication of adequate adhesion. Do not use nails, screws, or any other type of non-thermal mechanical fastener.
- F. Slivering and Rasping of Insulation Board Surface.
1. After insulation boards are firmly adhered to the substrate, fill any open joints in the insulation board layer with slivers of insulation or spray foam. Use spray foam that is identified by the spray foam manufacturer as suitable for this use.
 2. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.
- G. Trim, Reveals and Projecting Aesthetic Features
1. Attach features and trim where designated on drawings with adhesive to the insulation board or sheathing surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveals minimum 1:2 (27°).
 2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
 3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.
 4. Do not locate reveals/aesthetic grooves at high stress areas such as corners of windows, doors, etc.
 5. A minimum ¾ inch (19 mm) thickness of insulation board must remain at the bottom of the reveals/aesthetic grooves.

H. Completion of Backwrapping

1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.

I. Base Coat and Reinforcing Mesh Application

1. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of windows, doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.
2. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
3. Ultra-High impact mesh application (recommended to a minimum height of 6'-0" [1.8 m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact, and where indicated on contract drawings): apply base coat over the insulation board with StoSilo spray equipment or a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt the mesh at seams. Allow the base coat to dry.
4. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with StoSilo spray equipment or a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 2-1/2 inch (64 mm) overlap in each direction. Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible.
5. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the weather exposed sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2-1/2 inches (65 mm).
6. Allow base coat to thoroughly dry before applying primer or finish.

J. Finish Coat Application

1. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
 - a. Avoid application in direct sunlight.
 - b. Apply finish in a continuous application, and work to an architectural break in the wall.
 - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
 - d. Do not install separate batches of finish side-by-side.
 - e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
 - f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.05 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.

- B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.06 CLEANING, REPAIR, AND MAINTENANCE

- A. Clean and maintain the Exterior Insulation and Finish System (EIFS) for a fresh appearance and to prevent water entry into and behind the system. Repair cracks, impact damage, spalls or delamination promptly.
- B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into the wall assembly.

END OF SECTION

SECTION 07 27 26
FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Fluid-applied, vapor-permeable membrane air barriers for use over glass mat gypsum wall sheathing and other substrates indicated.

1.03 RELATED REQUIREMENTS

- A. Section 06 16 00 - Sheathing
- B. Section 07 62 00 - Sheet Metal Flashing and Trim
- C. Section 07 92 00 - Joint Sealants

1.04 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.

1. Build integrated mockups of exterior wall assembly , 150 sq. ft. (14 sq. m), incorporating backup wall construction, external cladding, aluminum window/curtainwall jamb, head and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, lot number and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.
- C. During cold weather, maintain product temperature within acceptable range for application, as required by air barrier manufacturer. Protect freeze-sensitive materials from freezing.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.11 WARRANTY

- A. The manufacturer shall warrant the product against material defects, or defects in manufacturing for Five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Carlisle Coatings & Waterproofing, Inc.
 1. Other Acceptable Manufacturers: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. XYZ Corporation.
 - b. Carlisle Coatings & Waterproofing Inc.; Barritech VP.
 - c. Grace, W. R., & Co. - Conn.; Perm-A-Barrier VP.
 - d. Henry Company; Air-Bloc 33.
 - e. Rubber Polymer Corporation, Inc.; Rub-R-Wall Airtight VP.
 - f. Tremco Incorporated, an RPM company; ExoAir 230.
 2. Substitutions: Not permitted.

2.02 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

2.03 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER

- A. General: Air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Performance Requirements:
 - 1. Product shall be minimum 0.013 inch (13mils) dry thickness membrane on exterior sheathing and minimum 0.026 inch (26 mils) dry thickness membrane on concrete and masonry. Dry membrane thickness shall be calculated based on field-measured wet mil thickness using a comb gauge and volume % solids of the product.
 - 2. Product shall be a high-solids, low VOC, moisture-curing material: silane terminated polyether (STPE), polyurethane or silicone chemistry with minimum 80% solids by volume and maximum 100g/L VOC
 - 3. Installed product and accessories shall have an upper service temperature limit of 180°F or higher.
 - 4. Manufacturer shall provide product and accessories which have a minimum installation temperature of 15°F or lower.
 - 5. Performance:
 - a. Air Permeance: ASTM E2178: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference.
 - b. Vapor Permeance: ASTM E96/E96M: Minimum 10 perms (70 g/m2/24h) when tested to water method (B).
 - c. Tensile Strength: ASTM D412:100 lbs/sq. in., minimum.
 - d. Tensile Elongation: ASTM D412: Minimum 200 percent.
 - e. Water Resistance: AATCC Test Method 127: Product over CMU substrate and over gypsum sheathing with joint shall resist a 55 cm (22 inch) column of water for 5 hours, no leaking or wet through.
 - f. Surface Burning: ASTM E84: Flame Spread Index: 25, Smoke Generation Index: 450.

2.04 ACCESSORY MATERIALS

- A. General: Provide from same manufacturer as air barrier membrane.
- B. Sheet Detail Flashing: Foil composite faced rubberized asphalt flashing, minimum 0.040 inch (40 mils) thickness.
 - 1. Fire-Resist 705 FR-A or Fire-Resist 705 FR-A LT low temperature application formula by Carlisle Coatings & Waterproofing, Incorporated
 - 2. Others as approved by air barrier membrane manufacturer
- C. Contact Adhesive:
 - 1. Carlisle Coatings & Waterproofing, Incorporated:
 - a. Over approved wall substrates: CCW-702 Solvent-Based, CCW-702 LV VOC Compliant Solvent-Based, CCW-702 WB Water-Based, CAV-GRIP™ Aerosol Spray or Travel-Tack portable aerosol spray cans
 - b. Over cured liquid air barrier: CAV-GRIP™ Aerosol Spray or Travel-Tack portable aerosol spray cans
 - 2. Others as approved by air barrier membrane manufacturer
- D. Liquid Detail Flashing. Silane-terminated polyether, minimum 80% solids.
 - 1. Barribond trowel-applied at minimum 40 wet mils thickness
 - 2. Barrithane VP roller or brush-applied at minimum 40 wet mils thickness, all cracks and gaps exceeding 1/16 inch filled with detail sealant or fill compound struck flush.
 - 3. Others as approved by air barrier membrane manufacture
- E. Detail Sealant: Silane-terminated polyether, minimum 90% solids, ASTM C 920 Type S, Grade NS, Class 25, Use NT.

1. Barribond by Carlisle Coatings & Waterproofing, Incorporated
 2. Others as approved by air barrier membrane manufacturer
- F. Fill Compound: 2-part, non-sag polyurethane sealant
1. Carlisle Coatings & Waterproofing, Incorporated: CCW-201
 2. Others as approved by air barrier membrane manufacturer

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions affecting installation of the air & vapor barrier and accessory products for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind or around the air barrier installation.
- C. Concrete and masonry shall be cured for a minimum of three days. It shall be smooth, with sharp protrusions such as form joints or fins removed and ground flush. Honeycomb and holes/cracks shall be filled with grout or mortar.
- D. Surfaces shall be sound, dry and free of oil, grease, dirt, excess mortar or other contaminants.
- E. Surfaces shall be supported and flush at joints without large voids or sharp protrusions.
- F. Mortar joints shall be struck flush and shall be free of voids. Mortar droppings shall be removed from brick ties and all other surfaces accepting air barrier.
- G. Sheathing boards shall be flush at joints, with gaps between boards according to building code and sheathing manufacturer's requirements. Sheathing boards shall also be securely fastened to the structure with proper fastener type, technique and spacing according to building code and sheathing manufacturer's requirements. Sheathing boards shall be repaired or replaced if inspection reveals moisture damage, mechanical damage or if sheathing boards have exceeded the exposure duration or exposure conditions as required by the sheathing manufacturer.
- H. Plywood, OSB, lumber or pressure-treated wood moisture content, measured with a wood moisture meter in the core of the substrate, shall be below 20%.

3.02 SURFACE PREPARATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Cover counter-sunk fasteners and holes through exterior sheathing with fill compound or detail sealant struck flush.
- I. Fill cracks, gaps and joints with fill compound, detail sealant or other material approved by air barrier manufacturer.

- J. Fill rough gaps around pipe, conduit and similar penetrations with mortar, non-shrink grout, fill compound or polyurethane foam sealant shaved flush.
- K. Apply a 3/4-inch cant of fill compound or detail sealant at the intersection of the base of the wall and the footing.

3.03 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints, pockets voids and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
 - 1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches (75 mm) along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of fluid air-barrier material at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air-barrier material over joint reinforcing strip.

3.04 DETAILING

- A. Detailing requires materials and installation at joints, transitions, openings, terminations, penetrations and similar conditions. Perform detailing before or after product installation.
- B. Install product and accessories in details as directed in manufacturer's literature.
- C. Cover sheathing joints with 2" width liquid detail flashing centered over joint:
- D. Sheathing inside and outside corners. Install flashing bearing 3 inches minimum onto either side of angle change. Use either of the following methods:
 - 1. Sheet detail flashing
 - 2. Liquid detail flashing
- E. Window rough openings. Install flashing bearing onto wall 3 inches minimum and returning into opening according to Project drawings. Use either of the following methods:
 - 1. Sheet detail flashing
 - 2. Liquid detail flashing
- F. Pipe or duct penetrations. Install flashing bearing onto wall 3 inches minimum and bearing onto pipe or duct 3 inches, or according to Project drawings. Use either of the following methods:
 - 1. Sheet detail flashing
 - 2. Liquid detail flashing
- G. Expansion or deflection joints: Install sheet detail flashing incorporating bellows or expansion bulb to allow joint movement. Flashing shall bear 3 inches minimum onto either side of joint.
- H. Interface of dissimilar substrates: Install sheet detail flashing, covering transition and bearing 3 inches minimum onto either side of transition.
- I. Prepare all surfaces accepting sheet detail flashing with contact adhesive provided by the same manufacturer. Apply contact adhesive to substrate with sufficient footprint to extend 1 inch beyond edges of sheet detail flashing. Follow contact adhesive application technique and drying time as specified in manufacturer's literature.
- J. Press sheet detail flashing firmly in place with a suitable hand roller tool.
- K. Sheet detail flashings shall be firmly adhered to the substrate, with no wrinkles, fishmouths or bridging at corners. Seal all terminations of sheet detail flashing with a tooled ribbon of detail sealant, centered over termination.
- L. Liquid detail flashings shall be smooth, free of voids and meeting the minimum installation thickness of 40 wet mils.

3.05 INSTALLATION

- A. General: Apply fluid air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.
 - 1. Apply primer to substrates at required rate and allow it to dry.
 - 2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- B. Membrane Air Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
 - 1. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, but not less than 40-mil (1.0-mm) dry film thickness, applied in one or more equal coats.
- C. Apply strip and transition strip over cured air-barrier material overlapping 3 inches (75 mm) onto each surface according to air-barrier manufacturer's written instructions.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.06 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Qualitative Air-Leakage Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, smoke pencil with pressurization or depressurization.
 - 2. Quantitative Air-Leakage Testing: Air-barrier assemblies will be tested for air leakage according to ASTM E 783.
 - 3. Adhesion Testing: Air-barrier assemblies will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. (207 kPa) according to ASTM D 4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.
- C. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.07 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 60 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

- C. Remove masking materials after installation.

END OF SECTION

SECTION 07 54 23
TPO SINGLE-PLY ROOFING SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. TPO Thermoplastic Single-Ply Roofing System

1.03 RELATED REQUIREMENTS

- Section 05 31 00 - Steel Decking
- Section 06 10 00 - Rough Carpentry
- Section 07 62 00 - Sheet Metal Flashing and Trim
- Section 07 72 00 - Roof Accessories

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's written information listed below.
 - 1. Product data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements.
- B. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Warranty:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Source Limitations: Obtain components including for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- C. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- D. This roofing system must be installed by a Manufacturer Authorized Roofing Applicator in compliance with drawings and specifications as approved by the manufacturer.
- E. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative (FSR) of the Manufacturer to ascertain that the membrane roofing system has been installed according to the specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.

- F. Preconstruction Roofing Conference: Before starting roof system construction, conduct conference at Project site.

1.06 DESIGN CRITERIA

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. The completed roof system shall meet the following requirements:
1. IBC 2018, Section 1609.
 2. ASCE 7, Chapters 26 to 30.
 3. External Fire Rating: UL Class A.
- C. Wind Load Design:
1. Risk Category: III.
 2. Basic Wind Speed (3-second gust): $V_{ult} = 120$ mph per Figure 1609.3(2).
 - a. Wind speed conversion per Table 1609.3.1: $V_{asd} = 93$ mph
 3. Surface Roughness Category (1609.4.2): B.
 4. Exposure Category (1609.4.3): C.
 5. ASTM D6630: Design uplift-resistance loads shall have a minimum 2.0 safety factor from the design wind uplift loads determined using ASCE 7.
- D. Wind Uplift Performance: Per IBC 2018, Section 1609.1, wind loads shall be determined in accordance with ASCE 7, Method 1 - Simplified Method.
- E. Roof Covering External Fire Resistance Classification: Class A when tested per UL 790.
- F. Thermal Performance: Roof system will achieve a R-value of:
1. Sloped Roof Structure: R-30ci (minimum). Refer to the structural drawings for slope provided by the roof framing system.
 2. Flat Roof Structure (No Slope) with tapered insulation: R-30 (Average).
- G. Drainage: Provide a roof system with positive drainage where all standing water dissipates within 48 hours after precipitation ends.

1.07 MOCK-UP

- A. Provide mock-up for evaluation of surface preparation, installation methods, and workmanship. mock-up.
- B. See Section 01 40 00 for additional requirements.
- C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.
- D. Keep Material Safety Data Sheets (MSDS) at the project site at all times during transportation, storage, and installation of materials.

1.09 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- C. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or

be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

- D. New roofing shall be complete and weathertight at the end of the work day.
- E. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard 20-year NDL roof warranty, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.
 - 2. Wind Damage Coverage: Winds of 3-second peak gust speeds up to 72 mph, measured at 10-meters above ground using available meteorological data.
 - 3. Hail Damage Coverage: No.
 - 4. Puncture Coverage: No.
 - 5. Warranty Period: 20 years from the Date of Substantial Completion.
- B. Installer's Warranty: Submit roofing Installer's warranty covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Carlisle SynTec
- B. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be accepted. Additional manufacturers will be considered in accordance with the "or equal" provision specified in Section 01 60 00 - Product Requirements.
 - 1. Firestone Building Products Company.
 - 2. GAF Materials Corporation.
 - 3. GenFlex Roofing Systems.
 - 4. Johns Manville.
- C. Substitutions: Submit a request for substitution for any manufacturer not named, as specified in Division 1.

2.02 SCOPE / APPLICATION

- A. TPO Membrane Roofing: One-Ply membrane, fully adhered, over cover board and insulation.

2.03 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: Rigid board with glass fiber reinforced facers (GRF) on both sides, meeting or exceeding the requirements of ASTM C1289, Type II, Class 1, fiber reinforced felt both faces; Grade 2 (20 psi).
 - 1. Basis of Design Product: Carlisle "InsulBase".
 - 2. Panel Thickness: Varies from 1/2-inch to 4 1/2-inches.
 - 3. Properties:
 - a. Compressive Strength: ASTM D1621: 20 pounds per square inch (138 kPa), Grade 2.
 - b. Density: ASTM D1622/D1622M: 2 pcf.
 - c. Dimensional Stability: ASTM D2126: Less than 2% linear change (7 days).
 - d. Moisture Vapor Transmission: ASTM E96/E96M: < 1 perm.
 - e. Water Absorption: ASTM C209: < 1% by volume.
 - f. Service Temperature: -100 to 250 Deg F.
 - 4. Application Method: Mechanically Attached.
 - 5. Slope: 1/4-inch per foot, minimum.

6. R-Value: 5.7 per inch.
 - a. Minimum thickness at roof drains: 2-inches.
- B. Flat Panel Insulation:
 1. Panel Thickness: 2.5 inches (64 mm).
 - a. Multiple Layer Configurations: For configurations requiring more than 2.7-inches of insulation, a multiple layer configuration is recommended.
 2. Insulation Thickness/R-Value: Provide total thickness of polyisocyanurate insulation to achieve the following R-values:
 - a. Sloped Roof Structure: R-30ci (minimum). Refer to the structural drawings for slope provided by the roof framing system.
 - b. Flat Roof Structure (No Slope): Refer to "Tapered Insulation" Article below.
 3. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain.
 - a. Cricket shall slope 1/4-inch per foot unless otherwise indicated.
- C. Tapered Insulation:
 1. Panel Thickness: Panel thickness varies with taper/slope of the panel.
 - a. Roof Crickets: Provide factory-tapered insulation boards fabricated to slope 1/4-inch per foot towards roof drains, gutters, or thru-wall scuppers. Crickets shall slope 1/4-inch per foot unless otherwise indicated.
 2. Insulation Thickness / R-Value over Flat Roof Structure (no slope): Provide tapered configuration of polyisocyanurate insulation to achieve an average R-value of 30, per the 2018 IECC, Table C402.1.3.
 - a. Minimum Insulation Thickness: 2-inches at roof drains, gutters, or thru-wall scuppers.

2.04 COVER BOARD

- A. Water-resistant and silicone treated gypsum panel with embedded fiberglass facer on both sides, and pre-primed on one side. GP Gypsum Dens-Deck Prime, distributed by Carlisle.
 1. Board Thickness: 1/2 inch (13mm).

2.05 SINGLE-PLY ROOF MEMBRANE:

- A. Basis of Design Product:
 1. Carlisle "Sure-Weld" Adhered TPO Roofing System.
- B. Material: Thermoplastic Polyolefin (TPO) complying with ASTM D6878/D6878M.
- C. Thickness: 60 mils (0.060 inch) (1.5 mm), minimum.
- D. Sheet Width: Factory fabricated into largest sheets possible.
- E. Color: White.
- F. Attachment Method: Adhered.
- G. Seaming Materials: As recommended by membrane manufacturer.
- H. Vapor Retarder: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.
 1. Fire-retardant adhesive.

2.06 FLASHING

- A. Prefabricated Roofing Expansion Joint Flashing: Sheet butyl over closed-cell foam backing seamed to galvanized steel flanges.
- B. Flashing Membrane:
 1. Carlisle Sure-Weld TPO Flashing, 60-mils thick.
- C. Prefabricated Flashing Accessories:
 1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
 2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.

3. Sealant Pockets: Same material as membrane, with manufacturer's standard accessories, in manufacturer's standard configuration.
4. Walkway Rolls: Sure-Flex Heat Weldable Walkway Rolls; 80 mils (0.080 inch) (2 mm) thick; gray membrane.
5. Miscellaneous Flashing: Non-reinforced TPO membrane; 80 mils (0.080 inch) (2 mm) thick, in manufacturer's standard lengths and widths.

2.07 PRIMERS, ADHESIVES, SEALANTS AND CLEANERS

- A. Primer:
 1. Carlisle TPO Primer.
- B. Membrane Adhesive:
 1. Carlisle Sure-Weld Bonding Adhesive: A high-strength, synthetic rubber adhesive.
- C. Sealants:
 1. Sure-Weld Cut Edge Sealant: A clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane.
 2. Water Cut-Off Mastic: Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging
 3. Universal Single-Ply Sealant: A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.
 4. Thermoplastic, One-Part Pourable Sealant: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets.
- D. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.
 1. Carlisle Weathered Membrane Cleaner.

2.08 FASTENING COMPONENTS

- A. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
 1. HP Fastener: Threaded, E-coat, square head fastener for insulation attachment to steel, wood plank, plywood or oriented strand board decks.

2.09 EDGES AND TERMINATIONS

- A. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.
- B. Edgings and Terminations: Manufacturer's standard edge and termination accessories.
 1. TPO Coated Sheet Metal.
- C. Termination Bar: A 1-inch wide and 98-mil thick extruded aluminum bar pre-punched 6-inches on center which incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

2.10 ROOF WALKWAYS

- A. Roof Walkways:
 1. Thickness: 180 mils.
 2. Color: Gray.
 3. Walkway material may be heat welded to Sure-Weld membrane using an automated heat welder or hand held heat welder.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.

- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION

- A. Clean substrate thoroughly prior to roof application.
- B. Do not begin work until other work that requires foot or equipment traffic on roof is complete.

3.03 INSTALLATION - ROOF INSULATION

- A. Install insulation or membrane underlayment in multiple layers over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure insulation to the substrate with the required mechanical fasteners in accordance with the manufacturer's current application guidelines.
 - 1. Enhance the perimeter and corner areas in accordance with the International Building Code (ASCE 7) or ANSI/SPRI WD-1.
- C. Stagger joints in one direction unless joints are to be taped. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). Fill all gaps in excess of 1/4 inch (6 mm) with same insulation material.
- D. Wood nailers must be at least 3 1/2 inches (89 mm) wide or 1 inch (25 mm) wider than adjacent metal flange. Thickness must equal that of insulation but not less than 1 inch (25 mm) thickness.
- E. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
- F. Do not install any more insulation than will be completely waterproofed each day.

3.04 INSTALLATION - COVER BOARD

- A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
- C. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
 - 1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

3.05 INSTALLATION - ROOF MEMBRANE (SURE-WELD FULLY ADHERED)

- A. Comply with membrane roofing system manufacturer's written instructions for installing roof membrane.
- B. Apply approved Bonding Adhesive in accordance with the manufacturer's instructions.
- C. Seam Welding: Hot-air weld the Sure-Weld membrane sheets in accordance with the manufacturer's hot air welding procedures.

3.06 FLASHING

- A. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.07 INSTALLATION - WALKWAYS

- A. Install walkways at all traffic concentration points as identified on the Drawings.
- B. Hot-air weld walkway pads to the membrane in accordance with the manufacturer's current application guidelines.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Require site attendance of roofing and insulation material manufacturers periodically during installation of the roofing system.

3.09 DAILY SEALS

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.10 CLEAN UP

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

3.11 PROTECTION

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

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.
- C. Miscellaneous trim, flashing, closures and accessories.

1.03 RELATED SECTIONS

- Section 06 10 00 - Rough Carpentry.
- Section 077200 - Roof Accessories.
- Section 07 92 00 - Joint Sealants.

1.04 SUBMITTALS

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Samples: Submit two samples 2 by 4 inch (____by____ mm) in size illustrating metal finish color.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Berridge Manufacturing Company.
- B. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. MBCI.
 - 2. AEP Span.
 - 3. CENTRIA Architectural Systems.
 - 4. Fabral.
 - 5. Petersen Aluminum Corporation .
 - 6. Tremco.
 - 7. Pac-Clad.
 - 8. Centria.
 - 9. ATAS International, Inc.
 - 10. Metl-Span.
- C. Substitutions: 012500 - Substitution Procedures.

2.02 SHEET METAL MATERIAL

- A. Pre-Finished Galvanized Steel: Prefinished metal shall be 24-gauge Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, with AZ50/AZM150 coating. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

1. Nominal Thickness: 0.024 inch (24-gauge).
 2. Surface: Smooth, flat finish.
 3. Exterior Finish: Two-coat fluoropolymer.
 4. Color: To match existing.
- B. Strippable film shall be applied to the top side of all prefinished metal to protect the finish during fabrication, shipping and field handling. This strippable film MUST be removed immediately before installation.

2.03 FINISH

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Paint Finish:
1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.75 ± 0.05 mil (0.019 ± 0.0013 mm) over 0.2 ± 0.05 mil (0.05 ± 0.0013 mm) primer coat, to provide a total dry film thickness of 0.95 ± 0.10 mil (0.024 ± 0.0025 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2.04 FABRICATION

- A. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- B. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing . Return and brake edges.

2.05 ACCESSORIES

- A. Metal Components:
1. Provide accessories and other items essential to a complete roof or wall panel installation including panel clips, trim, closures, fascia, soffits, caps and similar metal components.
 2. Metal components fabricated from same gauge and finish as metal panels, unless otherwise noted.
 3. Flashing: Provide the same gauge and finish as the exterior panel, unless otherwise noted.
- B. Sealants:
1. Exposed Sealants: One component silicone based as recommended by panel manufacturer: field applied.

2. Concealed Sealants: Non-curing, non-skinning butyl, polyisobutylene or polybutane tape as recommended by panel manufacturer; field applied.
- C. Fasteners:
 1. Exposed fasteners shall be hex head self-drilling screws with bonded washers and color to match panels. Screws may be either plated steel or stainless steel as noted on the Drawings.
 2. Exposed stainless steel rivets shall match color finish of panel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.

3.03 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
 7. Retain subparagraph below if required to prevent galvanic corrosion between graphite and aluminum or aluminum-zinc alloy-coated steel. See the "Metal Considerations" Article in the Evaluations.
 8. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- E. Seal joints as shown and as required for watertight construction.
 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg

- C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Retain metals in first two subparagraphs below that are specified in Part 2; revise to suit Project. Soldering requires removal of painted, coated, or lacquered finishes. Although unusual, zinc-coated (galvanized) steel, a type of metallic-coated steel, may be soldered.
 2. Do not solder metallic-coated steel sheet.
 3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.04 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

3.05 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.06 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.07 ERECTION TOLERANCES

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

3.08 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Roof hatches and accessories.
- B. Non-penetrating rooftop assemblies.

1.03 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 54 23 - TPO Single-Ply Roofing System
- D. Section 07 62 00 - Sheet Metal Flashing and Trim

1.04 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- B. Shop Drawings: Submit detailed layout developed for this project. Show dimensioned location and number for each type of roof accessory.
 - 1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing products similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing roof accessories to attain designed operational performance.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.07 WARRANTY

- A. Roof Hatch, Safety Rail, and Safety Post: Manufacturer's warranty: Materials shall be free of defects in material and workmanship for a period of five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roof Hatches:
 - 1. Specified Manufacturer: The Bilco Company
 - a. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1) Acudor Products Inc.
 - 2) Babcock-Davis
 - 3) Milcor, Inc.

- b. Substitutions: Not permitted.
- B. Non-Penetrating Roof Assemblies:
 - 1. Specified Manufacturer: Portals Plus
 - a. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1) PHP Systems Design.
 - 2) Metal Roof Innovations, Ltd.
 - b. Substitutions: Not permitted.

2.02 ROOF HATCHES

- A. Roof Hatches - General:
 - 1. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing.
 - 2. Hardware
 - a. Heavy pintle hinges shall be provided.
 - b. Cover shall be equipped with a spring latch with interior and exterior turn handles.
 - c. Roof hatch shall be equipped with interior and exterior padlock hasps.
 - d. The latch strike shall be a stamped component bolted to the curb assembly.
 - e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
 - f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
 - g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- B. Roof Hatch for Ships Ladder Access:
 - 1. Product: Bilco; Type NB-40; Aluminum cover and galvanized steel curb, single leaf roof hatch.
 - 2. Size: 30-inches by 54-inches (762 mm by 1372 mm).
 - 3. Frame/Curb: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
 - a. Material: 14 gauge (1.9 mm) paint bond G90 galvanized steel.
 - b. Finish: Factory prime paint.
 - c. Curb Insulation: Manufacturer's standard; 1 inch (25 mm) rigid high-density fiberboard, located on outside face of curb.
 - d. Curb Height: 12 inches (305 mm) from finished surface of roof, minimum.
 - e. Fabrication:
 - 1) The curb shall be formed with a 3-1/2" (89mm) flange with 7/16" (11.1mm) holes provided for securing to the roof deck.
 - 2) The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners.
 - 4. Cover:
 - a. Material: 11-gauge (2.3 mm) aluminum.
 - b. Finish: Mill finish aluminum.
 - c. Cover Insulation: Shall be fiberglass of 1" (25mm) thickness, fully covered and protected by a metal liner of 18-gauge (1.0 mm) aluminum.
 - d. Fabrication:
 - 1) Provide with a 3-inch (76 mm) beaded flange with formed reinforcing members
 - 2) Gasket: Provide a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
 - 5. Performance characteristics:

- a. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m²) with a maximum deflection of 1/150th of the span or 20 psf (97 kg/m²) wind uplift.
 - b. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - c. Operation of the cover shall not be affected by temperature.
 - d. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
 - 6. Accessories:
 - a. Safety Railing System as specified below.
 - b. Retractable Safety Post as specified below.
- C. Roof Hatch Accessories:
 - 1. Retractable Safety Post:
 - a. Product: Bilco, Model LU-2; Retractable Safety Post.
 - b. Performance criteria:
 - 1) Tubular post shall lock automatically when fully extended.
 - 2) Safety post shall have controlled upward and downward movement.
 - 3) Release lever shall disengage the post to allow it to be returned to its lowered position.
 - 4) Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.
 - c. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
 - d. Material of construction: Steel.
 - e. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
 - f. Hardware: All mounting hardware shall be Type 316 stainless steel.
 - g. Factory Finish: Hot-dipped galvanized.
 - 2. Safety Railing System:
 - a. Product: Bilco Company; Bil-Guard 2.0, Model #RL2-XX.
 - b. Performance Characteristics:
 - 1) Comply with 29 CFR 1910.23, with a safety factor of two.
 - 2) Hatch rail system shall attach to the capflashing of the roof hatch and shall not penetrate any roofing material.
 - 3) Hinged gate shall ensure continuous barrier around the roof hatch.
 - 4) Self-closing gate hinge and positive latching system provided with hatch rail system.
 - c. Fabrication:
 - 1) Posts and Rails: Aluminum pipe, 1-1/4 inch diameter, 6061 T6, Schedule 40.
 - 2) Gate: Same material as railing; automatic closing with latch.
 - 3) Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
 - 4) Curb mounting brackets: 6063 T5 aluminum extrusion.
 - d. Finish: High-visibility safety yellow powder coat finish.
 - e. Hardware: Mounting brackets shall be 3/8" (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

2.03 NON-PENETRATING ROOFTOP ASSEMBLIES

- A. Pipe Supports:
 - 1. Product: Portals Plus; Pedestal Plus.
 - a. Description: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly.
 - 2. Design Loadings and Configurations: As required by applicable codes.
 - 3. Height: Provide minimum clearance of 8-inches under supported items to top of roofing.

4. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
5. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
6. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install roof accessories in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

3.04 CLEANING

- A. Clean installed work to like-new condition.

3.05 PROTECTION

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

END OF SECTION

SECTION 07 81 00
APPLIED FIREPROOFING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Section includes sprayed fire-resistive materials (SFRM).

1.03 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 05 21 00 - Steel Joist Framing
- C. Section 05 31 00 - Steel Decking
- D. Section 07 05 53 - Fire and Smoke Assembly Documentation
- E. Section 07 81 23 - Intumescent Fire-Resistive Materials
- F. Section 07 84 00 - Penetration Firestopping

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Framing plans, schedules, or both, indicating the following:
 - 1. Extent of fireproofing for each construction and fire-resistance rating.
 - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
 - 4. Treatment of fireproofing after application.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions in size.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of fireproofing.
- C. Evaluation Reports: For fireproofing, from ICC-ES.
- D. Preconstruction Test Reports: For fireproofing.
- E. Field quality-control reports.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 - 1. Build mockup of each type of fireproofing and different substrate as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

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

1.08 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups of fireproofing.
 1. Provide test specimens and assemblies representative of proposed materials and construction.
- B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.
 1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.09 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is below 40 degrees F (4 degrees C) unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
 1. Primary structural frame (i.e. columns, beams/girders connected to columns, braces), 3 Hours: UL X790.
 2. Floor beams & associated secondary members, 2 Hours: UL N759
 3. Roof construction & associated secondary members, 1 1/2 Hours: UL D756.
- B. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction and the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Primers, Sealers, and Undercoaters: 200 g/L.
 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
- E. Asbestos: Provide products containing no detectable asbestos.

2.02 SPRAYED FIRE-RESISTIVE MATERIALS

- A. SFRM: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Isolatek International; Cafco 300 or Cafco 400.
 - b. GCP Applied Technologies; MK-5
 - 2. Applications:
 - a. For Interior Applications; Concealed.
 - b. For Interior Applications; Exposed to View and Away from Damage.
 - 3. Bond Strength: Minimum 150-lbf/sq. ft. (7.18-kPa) cohesive and adhesive strength based on field testing according to ASTM E736.
 - 4. Density: Not less than 15 lb/cu. ft. as specified in the approved fire-resistance design, according to ASTM E605/E605M.
 - 5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375-inches.
 - 6. Combustion Characteristics: ASTM E136
 - 7. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
 - 8. Compressive Strength: Minimum 10 lbf/sq. in. (68.9 kPa) according to ASTM E760/E760M.
 - 9. Corrosion Resistance: No evidence of corrosion according to ASTM E937/E937M.
 - 10. Deflection: No cracking, spalling, or delamination according to ASTM E759/E759M.
 - 11. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E760.
 - 12. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. (0.270 g/sq. m) in 24 hours according to ASTM E859/E859M.
 - 13. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
 - 14. Finish: Spray-textured finish.
 - a. Color: As indicated by manufacturer's designations.

2.03 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 - 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E736.
- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written

recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.

1. Minimum weight of 1.7 psf (8 kg/sq m), galvanized finish.
- E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.
 - F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.
 - G. Water: Clean, potable.
 - H. Overcoat: As recommended by manufacturer of applied fireproofing material.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:
 1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck has been completed before beginning fireproofing work.
- C. Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.03 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable

to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Metal Decks:
 - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, has been completed.
 - 2. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- F. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.
- J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.
- K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- L. Cure fireproofing according to fireproofing manufacturer's written recommendations.
- M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- N. Finishes: Where indicated, apply fireproofing to produce the following finishes:
 - 1. Spray-Textured Finish: Finish left as spray applied with no further treatment.

3.04 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the applicable chapter of current adopted IBC.
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
 - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.05 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION

SECTION 07 81 23
INTUMESCENT FIRE RESISTIVE MATERIALS (IFRM)

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Thin-film intumescent fire-resistive material for application to exposed structural steel.
- B. Protective and/or decorative topcoats.

1.03 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 05 21 00 - Steel Joist Framing
- C. Section 05 31 00 - Steel Decking
- D. Section 07 81 00 - Applied Fireproofing
- E. Section 07 84 00 - Penetration Firestopping

1.04 DEFINITION

- A. Intumescent Fire-Resistive Materials, from here on referred to as IFRM's, shall refer specifically to water-based intumescent coating designed for the fire protection of interior structural steel.

1.05 SYSTEM DESCRIPTION

- A. The IFRM's shall be applied at the required thickness to provide the UL fire resistive ratings.
- B. Provide labor, materials, equipment, and application necessary for, and incidental to, the complete and proper installation of intumescent fire protection for application to steel structures and supports in accordance with all applicable requirements of contract documents.

1.06 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- B. Selection Samples: For decorative top coat, color chips representing manufacturer's full range of available colors and sheens.
- C. Verification Samples: For each thickness, color, sheen, and finish required, samples not less than 4 inches (100 mm) square on steel substrate, illustrating finished appearance.
- D. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.
- E. Test Reports: Published fire resistive designs for structural elements of the types required for the project, indicating hourly ratings of each assembly.
- F. Field Quality Control Submittals: Submit field test report.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

1.07 QUALITY ASSURANCE

- A. Comply with ASTM E2924 for the testing, labeling, transportation, delivery, storage, shelf life, application and inspection of intumescent coatings.
- B. Provide materials and construction for hourly ratings listed in the Underwriters Laboratories, Inc. Fire Resistance Directory or as calculated by the American Iron and Steel Institute formula.

- C. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of ten years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- E. Mock-ups:
 - 1. Provide a mock-up for evaluation of surface preparation techniques and application workmanship; approved mock-up will serve as a standard of comparison for subsequent work of this section.
 - 2. Finish at least 100 sq ft (10 sq m) of steel in areas designated by Architect.
 - 3. Evaluate mock-up for compliance with specified requirements, including thickness and finish texture.
 - 4. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 5. Refinish mock-up area as required to produce acceptable work.
 - 6. Approved mock-up may remain as part of the project.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers with identification labels and testing agency markings intact and legible.
- B. Store products in manufacturer's unopened packaging until ready for installation.
 - 1. Protect from freezing, and do not store in direct sunlight.
 - 2. Dispose of any materials that have come into contact with contaminants of any kind prior to application.
- C. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.09 FIELD CONDITIONS

- A. Protect areas of application from windblown dust and rain.
- B. Maintain ambient field conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
 - 1. Provide temporary enclosures as required to control ambient conditions.
 - 2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F (10 degrees C) without specific approval from manufacturer.
 - 3. Maintain relative humidity between 40 and 60 percent in areas of application.
 - 4. Maintain ventilation in enclosed spaces during application and for not less than 72 hours afterward.

1.10 SEQUENCING & SCHEDULING

- A. Coordinate application of IFRM's with related work specified in other sections to comply with the following requirements:
 - 1. Prevent deterioration due to exposure to unfavorable environmental conditions.
 - 2. Protect fireproofing from abrasion and other damage likely to occur during construction operations after its application.
 - 3. The installation of piping, ducts, conduit or other suspended equipment shall not commence until the application of the IFRM is complete in that area.
 - 4. Install the IFRM to allow sufficient time for inspection, testing, and correction of defective fireproofing.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Isolatek International Corporation
 - 1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.

- a. Carboline Company.
- b. Albi Manufacturing.
- c. Contego International, Inc.
- d. Hilti Inc.

2.02 SYSTEM REQUIREMENTS

- A. Provide IFRM's tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
 1. Provide assemblies listed by UL or FM and bearing listing agency label or mark.
- B. Provide fire resistance ratings for building elements as required by the 2018 IBC.
 1. Refer to the Life Safety Plan in the drawings.

2.03 INTUMESCENT FIRE-RESISTIVE MATERIALS

- A. Product: CAFCO® SprayFilm® WB 5™ as supplied by Isolatek International.
- B. IFRM's shall be applied in accordance with drawings and/or specifications, and shall have been tested in accordance with the procedures of ANSI / UL 263 or ASTM E119, and reported by Underwriters Laboratories, Inc.
 1. Factory-mixed formulation.
 2. Water-Based Formulation: Approved by manufacturer and authorities having jurisdiction for indicated use.
 3. Verify with manufacturer that products selected are suitable for use indicated.
 4. UL Fire Tested Designs only based on ANSI/UL 263UL 263 (ASTM E119).
 5. Current Third Party Evaluation Service Report
 6. To assure an acceptable Architectural finish, no mesh is allowed.

2.04 MATERIALS

- A. IFRM Properties:
 1. Surface Burning Characteristics: Tested in accordance with ASTM E84.
 - a. Flame Spread Index (FSI): 25, maximum.
 - b. Smoke Developed Index (SDI): 50, maximum.
 2. For Interior Use:
 - a. Use only water-based products.
 - b. Use only products without fiber content.
 - c. VOC Content: Less than 500 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 - d. Durometer Hardness, Type D: 70, minimum, in accordance with ASTM D2240.

2.05 DECORATIVE TOPCOATING

- A. Topcoat materials shall be as required for color-coding, aesthetics or additional surface protection, approved by the thin-film fire resistive material manufacturer and applied in full accordance with the coating manufacturer's written instructions.
 1. Color and Gloss: As selected by Architect.

2.06 AUXILLARY MATERIALS

- A. Sealers and Primer: As required by tested and listed assemblies, and as recommended by fireproofing manufacturer to suit specific substrate conditions.
- B. Reinforcement: Glass fiber fabric matching type used in tested and listed assemblies.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fireproofing; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.
- B. Do not begin installation until substrates have been properly prepared.

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

3.02 PREPARATION

- A. Clean substrates, removing dirt, dust, oil, grease, loose material, incompatible primers, or other substances which may impair bonding of fireproofing to the substrate.
- B. Thoroughly clean surfaces to receive fireproofing.
- C. Repair substrates to remove surface imperfections that could effect uniformity of texture and thickness of fireproofing system, and remove minor projections and fill voids that could telegraph through finished work.
- D. Cover or otherwise protect other work that might be damaged by fallout or overspray of fireproofing system, and provide temporary enclosures as necessary to confine operations and maintain required ambient field conditions.

3.03 APPLICATION

- A. The IFRM shall be applied at the required dry film thickness per the appropriate design number guidelines and manufacturers written application instructions.
- B. Comply with manufacturer's instructions for particular conditions of installation in each case.
- C. Apply manufacturer's recommended primer to required coating thickness.
- D. Apply IFRM's to full thickness over entire area of each substrate to be protected.
- E. Apply coats at manufacturer's recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.
- F. Apply intumescent fireproofing by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.
- G. Achieve uniform finished appearance complying with approved mock-up.

3.04 CLEAN UP AND REPAIR

- A. Upon completion of installation, all excess material, overspray and debris shall be cleared and removed from the job site.
- B. All patching of and repair to thin-film fire resistive material, due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage. Patching shall be performed by an applicator with expertise in the installation of fire resistive or similar materials. Repair shall be in accordance with UL design number guidelines and manufacturers written application instructions.

3.05 INSPECTION AND TESTING

- A. In addition to continuous Wet Film Thickness checks performed by applicator during application, the installed intumescent material shall be inspected by a qualified independent testing laboratory for thickness in accordance with the AWCI Technical Manual 12-B "Standard Practice For The Testing and Inspection Of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide", Latest Edition, before application of the topcoat.
- B. The results of the above tests shall be made available to all parties at the completion of each area and approved prior to the application of topcoat.

3.06 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 40 00 - Quality Requirements.
 - 1. Arrange for testing of installed IFRM's by an independent testing laboratory using magnetic pull-off dry film thickness gage in accordance with SSPC-PA 2, and ensure it meets requirements of authorities having jurisdiction (AHJ).
 - 2. Submit field test reports promptly to Contractor and Architect.
- B. Repair or replace IFRM's at locations where test results indicate fireproofing does not meet specified requirements.

3.07 PROTECTION

- A. Protect installed IFRM from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 81 28

FIRE-PROTECTIVE INTUMESCENT THERMAL BARRIERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Surface preparation and application of fire-protective intumescent thermal barrier coating to spray- applied polyurethane foams.

1.03 RELATED SECTIONS

- A. Section 072129 - Foamed-In-Place Insulation.

1.04 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.

1.05 DEFINITIONS

- A. WFT: Wet Film Thickness.
- B. DFT: Dry Film Thickness.

1.06 SUBMITTALS

- A. Submit in compliance with Section 013300 - Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Samples: Submit samples for each type of coating system and each color of intumescent thermal barrier coating indicated. Submit Samples on rigid backing, not less than 200 mm (8 inches) square. Provide step coats on samples to show each coat required for system.
- D. Evaluation reports: Submit Evaluation reports in accordance with ICC-ESR 3702 showing compliance with applicable building codes.
 - 1. Submit Evaluation report from accredited independent evaluation agency, indicating compliance of intumescent thermal barrier with specifications for specified performance characteristics and physical properties.
- E. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.
- F. Applicator's Field Reports: Submit applicator's job work written reports that includes information about ambient conditions, application thicknesses and results of on-site testing to verify compliance of Work, as described in this Section.
- G. Operation and Maintenance Data: Submit operation and maintenance data for intumescent coatings work for inclusion in operation and maintenance manuals specified in Division 01.

1.07 QUALITY ASSURANCE

- A. Provide materials and construction for hourly ratings listed in the Underwriters Laboratories, Inc. Fire Resistance Directory or as calculated by the American Iron and Steel Institute formula.
- B. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of ten years of documented experience.
 - 1. Manufacturer shall have a program of continuous quality management implemented conforming to the requirements of ISO 9001. Submit proof of certification upon request.

- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- D. Mock-ups
 - 1. Construct mock-ups in accordance with requirements of Division 01 to verify selections made under sample submittals, and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 2. Apply mock-up of intumescent coating work, illustrating assembly including substrate preparation and quality of workmanship in presence of Architect and Owner.
 - 3. Mock-ups shall be used as a benchmark for judging the texture and thickness of the finished work. Mock-ups may form part of the completed Work if undisturbed at the time of substantial completion.
- E. Source Limitations: Obtain each coating system from single source from single manufacturer or provide a system approved in writing by intumescent thermal barrier coating manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data.
- B. Packaged materials shall bear the appropriate labels, seals and WHI and/or UL label (mark) for fire resistive ratings and shall be stored at temperatures in compliance with manufacturer instructions in a dry interior location away from direct sunlight.
- C. Ensure materials are not subjected to freezing temperatures.
- D. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained in accordance with manufacturer's recommendations, but not less than 50 deg F.

1.09 PROJECT CONDITIONS

- A. Ensure minimum substrate temperature and ambient temperature of 50 deg F is maintained prior to, during, and a minimum of 72 hours after application.
- B. Provide temporary enclosures and heat to maintain proper temperatures and humidity levels in application areas. Responsibility for provision of such temporary enclosures and heat shall be General Contractor's unless noted otherwise.
- C. Ensure ventilation of not less than 0.3 complete air exchanges per hour is maintained until materials are cured.
- D. Ensure relative humidity does not exceed 85% throughout application and curing period of materials. Provide compatible bonding primer and protective topcoats when Products are installed in areas of high humidity
- E. Do not apply products in snow, rain, fog, or mist, or to damp or wet surfaces.
- F. Allow wet surfaces to dry thoroughly and to attain temperature and conditions specified before starting or continuing coating operation.

1.10 WARRANTY

- A.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Products from International Fireproof Technology, Inc (P: 949-975-8588 / Web: www.painttoprotect.com) are specified to establish a standard of quality for design, function, materials, and appearance.
- B. Substitutions: 012500 - Substitution Procedures.

2.02 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Intumescent fire-resistive material: Provide intumescent thin-film fire resistive coating systems tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
 - 1. Provide assemblies listed by UL or FM and bearing listing agency label or mark.
- B. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated.
 - 2. Apply all products according to spreading rates recommended in writing by intumescent thermal barrier coating manufacturer.
 - 3. Comply with requirements for fire-protective coating classification and surface-burning characteristics indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

2.03 INTUMESCENT THERMAL BARRIER COATING SYSTEM

- A. Bonding Primer (where required): Interior unconditioned spaces subject to freeze thaw cycling, temperature and humidity variations or as required per tested and listed system. Waterborne, acrylic emulsion, adhesion- promoting bonding primer recommended in writing by manufacturer, if required, compatible with substrate and other materials indicated.
 - 1. Application thickness (WFT): not less than 3 mils, and not more than 5 mils.
 - 2. Acceptable product: "DTM Bonding Primer" by Sherwin Williams or approved equivalent recommended in writing by intumescent thermal barrier manufacturer.
- B. Fire-protective Intumescent Thermal Barrier Coating:
 - 1. Basis of Design Product: International Fireproof Technology; "DC-315".
 - 2. Protective coating with following characteristics, specifically formulated for application over polyurethane foam plastics and compatible with insulation:
 - a. Finish: Flat
 - b. Color: Ice Grey.
 - c. VOC Content: 47g/L
 - d. Shore D Hardness (before topcoat and finish coat are applied): 40.
 - e. Solids by Volume: 67%
 - f. Specific Gravity: 1.30 +/- 0.05 g/cc
 - g. Drying Time @ 25 deg C (77 deg F) and 50% R.H:
 - 1) To touch: 1-2 hours
 - 2) To recoat (if required): 2-4 hours
 - h. Flashpoint: None
 - i. Reducing or Cleaning: Water

2.04 ACCESSORIES

- A. Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design and code requirements. Such accessories include, but are not limited to, any required or optional items such as bonding agents, mechanical attachments; and application aids.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify suitability of substrates, including surface conditions, and compatibility with existing finishes and primers.
- B. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and coating systems indicated. Refer to test report for applicable brand and type of sprayed polyurethane foam to

verify compatibility, and if a primer is required. Provide compatible primer approved by intumescent thermal barrier manufacturer to required surfaces where required by applicable test reports.

- B. Provide masking, drop cloths or other suitable coverings to prevent overspray onto surfaces not intended to be coated with intumescent coating.
- C. Ensure substrates are clean, and free of substances, including dirt, oil, grease, loose materials and incompatible that could impair bond of coatings.
- D. Do not coat surfaces if surface moisture content or alkalinity exceeds that permitted in manufacturer's written instructions.
- E. Remove incompatible primers, and reprime substrate with compatible primers as required to produce coating systems indicated.
- F. Prime or "fog" glossy foam surfaces prior to applying intumescent thermal barriers.

3.03 APPLICATION

- A. Apply intumescent thermal barrier coatings according to manufacturer's written instructions and to comply with requirements for fire-protective coating classification and applicable test reports for spray urethane foam insulation.
- B. Use airless spray equipment and techniques best suited for substrate, and in accordance with requirements indicated in manufacturer's instruction guidelines.
- C. Apply each coat separately according to manufacturer's written instructions.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections.

3.04 CLEANING AND PROTECTION

- A. Upon completion of installation, clean excess material, overspray, and debris. Remove and clear such materials from Project site.
- B. Ensure patching of, and repair to, intumescent thermal barriers due to damage by other trades, is performed under this section, and paid for by trade responsible for damage.
- C. Ensure patching is performed by an applicator with expertise in the installation of intumescent thermal barrier coatings.

3.05 FIELD QUALITY CONTROL

- A. Continuously monitor WFT by performing checks to ensure correct thicknesses are applied.
- B. Measuring Thickness:
 - 1. Install medallions prior to applying the intumescent thermal barrier coating as a means of measuring wet film thickness and dry film thickness, or;
 - 2. Perform thickness measurements by measuring representative sample of installed intumescent coating material by means of calipers, optical comparators or similar devices.

3.06 IDENTIFICATION

- A. Upon completion, provide job site label or similar method of identifying product used. Affix job site label in a prominent location, clearly indicating applicator's name, contact information, company information, products used, and measured thickness.

END OF SECTION

SECTION 07 84 00
PENETRATION FIRESTOPPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Penetrations in fire-resistance-rated walls.
- B. Penetrations in horizontal assemblies.
- C. Penetrations in smoke barriers.

1.03 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 05 21 00 - Steel Joist Framing
- C. Section 05 31 00 - Steel Decking
- D. Section 07 81 00 - Applied Fireproofing
- E. Section 07 81 23 - Intumescent Fire-Resistive Materials

1.04 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Product Certificates: Certificate of conformance signed by manufacturers of through-penetration firestop system products certifying that products comply with requirements.

1.05 QUALITY ASSURANCE

- A. Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Criteria" Article:
 - 1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop system products bear classification marking of qualified testing and inspection agency.
- B. Engage an experienced installer who is FM4991 certified, licensed and otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to a Contractor or to an installer engaged by Contractor does not confer qualifications on buyer.
- C. Obtain through-penetration firestop systems for each type of penetration and construction condition indicated from a single manufacturer.
- D. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings".
- E. Replace/Reinstall material removed for any and all destructive testing performed.

1.06 DELIVERY, STORAGE, AND HANDLING

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

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

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.
- C. Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- D. Do not install through-penetration firestop systems when substrates are wet due to rain, frost, condensation, or other causes.
- E. Do not use materials that contain flammable solvents.

1.08 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
 - 1. A 3" minimum "NO FLY-ZONE" (no penetrations allowed) as measured from the underside of structure along the top of the wall shall be observed for all new penetration(s) in new and existing fire rated wall construction.
 - 2. All sub-contractors shall coordinate and receive approval for proposed locations of new penetrations in fire rated walls with the General Contractor PRIOR to the commencement of work.
- B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- D. Upon the installation of acoustic ceiling tiles in ceiling grid, any work that shall occur above the ceiling by trades contracted directly with the Owner or the General Contractor shall follow the procedures outlined in the Owner's "Above Ceiling Permit Policy".

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Specified Manufacturer: Specified Technologies Inc..
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. Fire-resistance-rated walls include fire-barrier walls and smoke-barrier walls.
 - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. Horizontal assemblies include floors and floor/ceiling assemblies.

2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- H. 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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.03 MATERIALS

- A. General: Use only through-penetration firestop system products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Latex Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant
 2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant
 3. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant
 4. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray
- C. Firestop Devices: Factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item, the following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars
 2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars
- D. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24", the following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads
 2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads

- E. Firestop Putty: Intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty
- F. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series RED Wrap Strip
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series BLU Wrap Strip
- G. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in a flame retardant poly bag, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows
- H. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar
- I. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag), the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) Pensil 300 Silicone Sealant
 - 2. Specified Technologies, Inc. (STI) Pensil 300 SL Self-Leveling Silicone Sealant
- J. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam
- K. Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal CS Composite Sheet
- L. Cast-In-Place Firestop Device: Single component molded firestop device installed on forms prior to concrete placement with totally encapsulated, tamper-proof integral firestop system and smoke sealing gasket, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal CD Cast-In Firestop Device
- M. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal FyreFlange Firestop Angles
- N. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal T-Collar Device
- O. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing individual cable penetrations up to 0.27 in. (7 mm) diameter, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) Ready Firestop Grommet
- P. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
 - 1. Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway

PART 3 EXECUTION

3.01 PREPARATION

- A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

- B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- D. Do not proceed until unsatisfactory conditions have been corrected.

3.02 THROUGH PENETRATION FIRESTOP INSTALLATION

- A. General Requirements: Install through-penetration firestop systems in accordance with "Performance Criteria" Article and in accordance with the conditions of testing and classification as specified in the published design.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration firestop systems products.
 - 1. Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
 - 2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - 3. Protect materials from damage on surfaces subjected to traffic.

3.03 BUILDING ASSEMBLY IDENTIFICATION

- A. Identify all smoke and or fire rated wall construction and fire rated ceiling construction, above ceiling areas with 2" minimum height, helvetica style, block lettering in fire engine red latex enamel paint color, at approximately 15' centers all directions, typically 6"+ above finished ceilings to bottom. Please note, the date is the date of installation.

"Sample" sign stencil:

UL Design P522
1-HR FIRE BARRIER
DATE

3.04 PENETRATION ASSEMBLY IDENTIFICATION

- A. Identify all smoke and or fire rated wall construction and fire rated ceiling construction penetrations, with above ceiling ID marker system with 2" minimum overall height, 1/8" lettering sizes, helvetica style, block lettering in embossed, etched, or durably painted or printed materials on durable plate or sticker, at an easily readable location, in close proximity to penetration. For above ceiling penetrations, below or below and to the side of the penetration. Please note, the date is the date of installation. Provide the owner with two (2) portable bar-code readers for these tags.

"Sample" ID:

UL Design W-L-1049
F-Rating: 1-HR
T-Rating: 0-HR
L-Rating @Ambient - Less than 1 CFM/Sq Ft
L-Rating @400 F - Less than 1 CFM/Sq Ft
Specified Technologies Inc. SpecSeal 100
DATE
Bar Code - Printed out for product

3.05 FIELD QUALITY CONTROL

- A. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems.
- B. Keep areas of work accessible until inspection by authorities having jurisdiction.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.06 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

- B. Clean all surfaces adjacent to sealed openings to be free of excess through-penetration firestop system materials and soiling as work progresses.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Silicone joint sealants.
- B. Urethane joint sealants.
- C. Latex joint sealants.
- D. Acoustical joint sealants.

1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete
Section 04 20 00 - Brick and Concrete Masonry
- B. Section 06 61 16 - Solid Surface Fabrications
- C. Section 08 11 13 - Hollow Metal Doors and Frames
- D. Section 09 21 16 - Gypsum Board Assemblies
- E. Section 09 30 00 - Tiling
- F. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework
- G. Section 12 36 61 - Quartz Surfacing Fabrications
- H. Divisions 21, 22, 23, 26, 27 specifications regarding building service systems that penetrate walls, floors, and ceilings.
- I. Seal interior penetration openings in a manner that prevents transmission of airborne noise and structural vibration into acoustically sensitive/critical spaces. Penetrations shall include conduit, duct, pipe, cable, recessed boxes, and other penetrants, assemblies, or devices noted in the Documents.

1.04 PRECONSTRUCTION TESTING

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate indicated.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

- a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
- b. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.05 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. 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.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and testing agency.
- B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- F. Field-Adhesion Test Reports: For each sealant application tested.
- G. Warranties: Sample of special warranties.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.
 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

- D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- E. Preinstallation Conference: Conduct conference at Project site.

1.08 PROJECT CONDITIONS

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

1.09 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Multiple manufacturer's specified.
 - 1. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Dow Corning Corporation.
 - b. GE Advanced Materials.
 - c. Tremco Incorporated.
 - d. Pecora Corporation.
 - e. BASF Building Systems.
 - f. Surebond.
 - g. Sherwin Williams
 - h. GE Advanced Materials.
 - i. Sika Flex.

2.02 MATERIALS, GENERAL

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

- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Basis-of-Design Manufacturer/Products: Subject to compliance with the Contract Documents, available products that may be incorporated into the Work include, but are not limited to, the following manufacturers: Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.03 SILICONE JOINT SEALANTS

- A. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Basis-of-Design Manufacturer/Product:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - d. Tremco Incorporated; Tremsil 200 Sanitary.
- B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
 - 1. Basis-of-Design Manufacturer/Products:
 - a. BASF Building Systems; Omniseal 50.
 - b. Dow Corning Corporation; 795.
 - c. GE Advanced Materials; SilPruf SCS2000.
 - d. Pecora Corporation; Pecora 895.
 - e. Tremco Incorporated; Spectrem 2.
 - f. Sika Corporation, Construction Products Division; SikaSil-C995.

2.04 URETHANE JOINT SEALANTS

- A. Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
 - 1. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Division 01 Section "Product Requirements."
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic SL 1.
 - b. Pecora Corporation; Urexpan NR-201.
 - c. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
 - d. Tremco Incorporated; Vulkem 45.
- B. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, for Use NT.
 - 1. Basis-of-Design Manufacturer/Products:
 - a. Pecora Corporation; Dynatrol II.
 - b. Tremco Incorporated; Dymeric 240 FC.

2.05 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

1. Basis-of-Design Manufacturer/Products:
 - a. BASF Building Systems; Sonolac.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco Incorporated; Tremflex 834.

2.06 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 1. Grabber; Acoustical Sound Sealant
 2. Pecora Corporation; AIS-919.
 3. Tremco; Acoustical Sealant
 4. USG Corporation; SHEETROCK Acoustical Sealant.

2.07 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, 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.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
- D. Expansion Joint Material: Preformed sealant shall be preformed, pre-compressed, self-expanding. Expanding foam to be cellular foam impregnated with a water-based, non-drying, polymer-modified 100% acrylic dispersion. Install as a secondary sealant to urethane sealant w/ backer rod provide BACKERSEAL as manufactured by EMSEAL Joint Systems, Ltd as indicated on the drawings for vertical expansion joint locations.
 1. Install BACKERSEAL at depth sufficient to allow installation of properly sized backer rod and sealant in front of material.
 2. Size: As indicated on the Drawings

2.08 MISCELLANEOUS MATERIALS

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal
 - b. Glass
 - c. Porcelain enamel
 - d. Glazed surfaces of glass tile
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- 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.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form

smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.
 4. Provide flush joint profile where indicated per Figure 8B in ASTM C1193.
 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations.

3.04 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 (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.05 CLEANING

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

3.06 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection,

damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.07 JOINT SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces.
 - 1. Joint Location:
 - a. Masonry control joints.
 - b. Joints around hollow metal frames and penetrating items.
 - c. Other joints as indicated.
 - 2. Joint Sealant: Multi-component, non-sag Urethane.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Vertical joints on exposed surfaces of walls and partitions.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - c. Other joints as indicated.
 - 2. Joint Sealant: Latex.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.
 - 1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Other joints as indicated.
 - 2. Joint Sealant: Single component, non-sag, mildew resistant, acid curing.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal non-traffic surfaces.
 - 1. Joint Location:
 - a. Acoustical joints where indicated.
 - b. Other joints as indicated.
 - 2. Joint Sealant: Acoustical.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION

SECTION 07 95 13
EXPANSION JOINT COVER ASSEMBLIES

PART 2 PRODUCTS

1.01 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Interior fire-rated and non-fire-rated hollow metal doors and frames.
- B. Exterior hollow metal doors and frames.
- C. Hollow metal borrowed lite/sidelight glazing frames.

1.03 RELATED SECTIONS

- A. Section 04 20 00 - Brick and Concrete Masonry
- B. Section 05 40 00 - Cold-Formed Metal Framing
- C. Section 07 92 00 - Joint Sealants
- D. Section 08 14 23 - Plastic Laminate Clad Wood Doors
- E. Section 08 71 00 - Door Hardware
- F. Section 08 80 00 - Glazing
- G. Section 09 21 16 - Gypsum Board Assemblies
- H. Section 09 22 16 - Non-Structural Metal Framing
- I. Section 09 91 13 - Exterior Painting
- J. Section 09 91 23 - Interior Painting

1.04 ABBREVIATIONS AND ACRONYMS

- A. ANSI - American National Standards Institute.
- B. HMMA - Hollow Metal Manufacturers Association.
- C. NAAMM - National Association of Architectural Metal Manufacturers.
- D. NFPA - National Fire Protection Association.
- E. SDI - Steel Door Institute.
- F. UL - Underwriters Laboratories.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door design.
 - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
- C. Samples for Verification:
 - 1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 125 mm).
 - 2. For the following items, prepared on Samples about 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.

- b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.
- D. Other Action Submittals:
 - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.06 INFORMATIONAL SUBMITTALS

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

1.07 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
 - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- C. Fire-Rated, Borrowed Lite Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
 - 1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

1.09 PROJECT CONDITIONS

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

1.10 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Steelcraft.
 - 1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Amweld Building Products, LLC.
 - b. Ceco Door Products; an Assa Abloy Group company.
 - c. Curries Company; an Assa Abloy Group company.
 - d. Windsor Republic Doors.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Division 08 Section "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.03 HOLLOW METAL DOORS - GENERAL

- A. Products: Steelcraft; as follows:
 - 1. Full flush door construction:
 - a. L and SL Series: Laminated
 - b. B Series: Steel stiffened.
 - c. T Series: Temperature rise rated.
 - d. Graintech Doors (Interior only): Embossed wood grain finish.
 - e. Fire-Rated Doors.

2.04 EXTERIOR HOLLOW METAL DOORS

- A. Product: Steelcraft; Full Flush Hollow Metal Doors, unless otherwise indicated.
- B. Standard: ANSI/SDI A250.8
 - 1. Level 3 - Extra Heavy-duty.
 - 2. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - 3. Edge Construction: Model 2 - Seamless.
- C. Model: L / SL Series (Laminated) and B Series (Steel stiffened).
- D. Physical Properties:
 - 1. Door Face Metal Thickness: Coated, 16 gage, 0.053 inch (1.3 mm), minimum.
 - 2. Door Face Sheets: Flush.
 - 3. Door Finish: Factory primed and field finished.
 - 4. Door Core Material:
 - a. Non-rated doors: Polyurethane, or polyisocyanurate.
 - b. Fire-Rated Doors: Mineral Board.
 - 5. Vertical Edges for Single-Acting Doors: Beveled edge.
 - a. Beveled Edge: 1/8-inch in 2-inches (3 mm in 50 mm).
 - 6. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
 - 7. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 - 8. Door Thermal Resistance: R-Value of 6.0, minimum.

9. Top Closures for Outswinging Doors: Flush with top of faces and edges.
10. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
 - a. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

E. Hardware: Refer to Section 08 71 00.

2.05 INTERIOR HOLLOW METAL DOORS

- A. OWNER STANDARD PRODUCT: Steelcraft; 'Grain-Tech Series' embossed hollow metal doors, fire-rated and non-fire-rated.
 1. Description: Fabricated from steel that has an embossed wood grain pattern extending the full height and width of the door. Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge seams. The wood grain embossment shall be 0.005-inches deep. The wood grain face sheets must be cleaned, phosphatized and prime painted with a stain absorbing primer. Vertical edges must be stained using conventional stains to achieve a color as selected by Architect.
 2. Locations:
 - a. All interior doors.
- B. Standard: ANSI/SDI A250.8 for level and model; ANSI/SDI A250.4 for physical performance level.
 1. Level: 2 - Heavy-duty.
 2. Physical Performance Level B.
 3. Edge Construction: Model 1 - Full Flush.
- C. Model: GrainTech Series (Embossed wood grain) and Fire-rated.
- D. Physical Properties:
 1. Door Face Metal Thickness: Uncoated, 18 gage, 0.042 inch (1.0 mm), minimum.
 2. Door Face Sheets: Embossed with wood grain.
 3. Door Finish: Factory primed and field finished.
 4. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
 5. Door Core: Manufacturers standard core material/construction and in compliance with requirements.
 6. Vertical Beveled Edge: 1/8-inch in 2 inches for single acting doors.
 7. Zinc Coating: Not required.
 8. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
 - a. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- E. Hardware: Refer to Section 08 71 00.
- F. Fire-Rated Doors:
 1. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 2. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
 3. Provide units listed and labeled by UL (DIR).
 - a. Attach fire rating label to each fire rated unit.
 4. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - a. Locations: interior doors where indicated.
- G. Smoke and Draft Control Doors: Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;

1. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
2. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
3. Label: Include the "S" label on fire-rating label of door.

2.06 HOLLOW METAL FRAMES

- A. Products: Steelcraft; as follows:
 1. F Series: Double rabbet and Cased opening set-up and welded frame.
 2. FE Series: Double egress, set-up and welded frame.
 3. Fire-Rated Frames.
- B. General:
 1. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
 2. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- C. Exterior Door Frames: Full profile/continuously welded type.
 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 2. Frame Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
 3. Frame Finish: Factory primed and field finished.
 4. Reinforcement: Provide high frequency hinge reinforcement at top hinge location.
 5. Weatherstripping: Separate, see Section 08 71 00.
- D. Interior Door Frames:
 1. Fire-Rated and Non-Fire Rated Frames: Full profile/continuously welded type.
 - a. Fabricate frames with mitered or coped corners.
 - b. Frame Metal Thickness:
 - 1) Steel or wood doors under 48-inches wide: 16 gage, 0.053 inch (1.3 mm), uncoated.
 - 2) Steel or wood doors over 48-inches wide: 14 gage, 0.067 inch (1.7 mm), uncoated.
 - 3) Borrowed Lite Glazed Frames: 16 gage, 0.053 inch (1.3 mm), uncoated.
 - c. Fire Rating: Same as door, labeled.
 - d. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
 - e. Frame Finish: Factory primed and field finished.
- E. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- F. Transom Bars: Fixed, of profile same as jamb and head.
- G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- H. Frames in Masonry Walls: Size to suit masonry coursing with head member 2-inches or 4-inches high to fill opening without cutting masonry units.

2.07 FRAME ANCHORS

- A. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- B. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
- C. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

- D. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.08 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.09 ACCESSORIES

- A. Glazing: As specified in Section 08 80 00.
- B. Astragals for Double Doors: Specified in Section 08 71 00.
- C. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- D. Grout for Frames: Portland cement grout with maximum 4 inch (102 mm) slump for hand troweling; thinner pumpable grout is prohibited.
- E. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.
- F. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- G. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- H. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

2.10 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
 - 1. Glazed Lites: Factory cut openings in doors.
 - 2. 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 (19 mm) beyond edge of door on which astragal is mounted.
 - 3. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. All frames shall be delivered with factory installed spreaders.
7. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Fire ratings may require additional anchors.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
 - c. Masonry Wall Type for doors and frames to 7'-0" high shall have 3 anchors per jamb in masonry and in excess of this height an additional anchor for each 2'-6" additional height or fraction thereof. Storm resistant framing systems shall have anchors in compliance with manufacturers tested assemblies for these openings.
 - d. Post-Installed Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
8. Door Silencers: Except on weather-stripped and acoustical doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 1. Locate hardware as indicated, matching Steelcraft standards for doors and frames, or if not indicated, according to ANSI A250.8.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 and 28 Sections.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow metal work.
 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.11 FINISHES

- A. Shop Prime Finish: Apply manufacturer's standard fast-curing, lead- and chromate-free primer, complying with ANSI A250.10 acceptance criteria; immediately after cleaning and pretreating. Primer shall be recommended by primer manufacturer for substrate and compatible with substrate and field-applied coatings.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating applied to the inside of hollow metal frames being installed in exterior wall construction. Thickness of coating shall be 1/16" inch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

4. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
5. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Standard Steel Doors:
 - a. Revise clearances in first four subparagraphs below to suit Project.
 - b. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - c. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - d. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
 - e. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
 1. Adjust for smooth and balanced door movement.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Touch-up:
 1. 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.

END OF SECTION

SECTION 08 14 23
PLASTIC LAMINATE CLAD WOOD DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Interior High-Pressure Decorative Laminate Faced Wood Doors
- B. Lite frames and glazing in clad wood doors

1.03 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 08 71 00 - Door Hardware
- C. Section 08 80 - Glazing

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including door construction description and WDMA I.S.1-A and AWS classifications.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the clad door supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Schedules: Submit manufacturer's schedules, including door dimensions, cutouts, species, finish, and hardware. Reference individual door numbers as indicated on the Drawings.
- D. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- E. Samples for Initial Selection: Submit two samples of door veneer, 6 by 6 inch (____ by ____ mm) in size illustrating wood grain, stain color, and sheen.
- F. Samples for Verification:
 - 1. Samples: Submit two samples of plastic laminate for each pattern as selected.
 - 2. Decorative laminate, 8 by 10 inches, for each color and pattern selected.
 - 3. Corner Sections of Door: Approximately 5-inches by 10-inches (127-mm by 250-mm), with door faces and edges representing actual materials to be used.
 - 4. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.
- G. Warranty: Sample of special warranties.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain clad wood doors through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors." and the following minimum values (for particle core doors):
 - 1. NWWDA TM-7 Cycle Slam Test: 1,000,000 cycles.
 - 2. NWWDA TM-8 Hinge Loading Test 1,000 lbs.
 - 3. NWWDA TM-10 Edge Screw Holding Test 850 lbs.
 - 4. NWWDA TM-10 Face Screw Holding Test 650 lbs.
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C. Doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.

1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.
 2. Temperature Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.
 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
 4. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral core doors
- D. Identifying Label: Each door shall bear an identifying label indicating:
1. Door Manufacturer, Order Number, Door Number, Fire rating (if applicable).
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing clad wood doors.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Do not subject doors to extreme conditions or changes in temperature or relative humidity in accordance with WDMA I.S.1-A.

1.08 WARRANTY

- A. Manufacturers' Warranty: Warrant clad wood doors for life of installation against warpage, delamination, and defects in materials and workmanship.
 1. Defects noted during warranty period shall be corrected at no cost to Owner. Corrective work shall include labor and material for repair, replacement, refinishing, and rehanging as required.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: V.T. Industries.
 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 CLAD WOOD DOORS AND PANELS

- A. Product: V.T. Industries; "Heritage" Collection, Flush Solid-Core High-Pressure Decorative Laminate Doors.
 1. Type: High Pressure Decorative Laminate (HDPL):
 - a. Non-Rated, 20-Minute Fire-Rated, and Fire-Rated:
 - 1) Fire-Rating: As indicated in drawings
- B. Compliance: WDMA I.S. 1A.
 1. Aesthetic Grade: Premium Grade.

2. Duty Level: Extra Heavy Duty.
3. Type: 5-Ply, bonded core.
 - a. Seven-Ply and Non-Bonded Core Construction: Not acceptable.
- C. Cores: See below.
- D. Environmentally Responsible Doors: Provide where specified doors manufactured with the following environmentally responsible components:
 1. Particleboard Core:
 - a. Low Emitting Materials: Interior flush clad wood doors must contain no added urea-formaldehyde resins.
- E. High-Pressure Decorative Laminates: NEMA LD3.
 1. Face laminate doors with high-pressure decorative laminates.
 2. Face Laminate doors (two faces and two horizontal edges) with High Pressure Decorative Laminates.
 - a. Face laminate the two vertical edges of fire rated pairs of doors only.
 3. Nominal Minimum Thickness for Faces and Vertical Edges: 0.048-inch.
 4. Laminate Selection: As indicated on the Interior Finish Legend in the drawings.
 5. Finish: Manufacturer's standard.
 6. Grade: General purpose, horizontal grade.
- F. Door Edge Banding: See below.

2.03 HPDL CLAD DOORS; NON-RATED AND 20-MINUTE FIRE-RATED

- A. Door Types (VTI; Heritage Collection): 5-Ply Flush Non-Rated and 20-Minute Fire-Rated HPDL Clad Doors.
 1. Model Nos.: PC-HPDL-5, PC-20-HPDL-5, and PC-20PP-HPDL-5.
- B. Door Thickness: 1-3/4 inches (44 mm).
- C. Door Facings:
 1. High Pressure Decorative Laminate Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS.
 2. Color or Wood Grain Pattern: As indicated on the Interior Finish Legend in the drawings.
- D. Door Edge Banding:
 1. PVC Edge Banding: 0.12-inch (3-mm) thick for vertical door edges, all doors.
 - a. Exception: Provide HDPL on the vertical edges of doors of fire-rated door pairs.
 2. Color: Manufacturer's standard for matching face laminate.
- E. Door Construction:
 1. Core: Particleboard core (PC), 5-ply.
 - a. Compliance: ANSI A208.1, Grade 1-LD-2.
 2. Wood Stiles and Rails: As required to meet Extra Heavy Duty Performance level.
 - a. Structural Composite Lumber at non-rated doors and manufacturer's standard non-combustible material at fire rated doors.
 3. Blocking: As required to meet Extra Heavy Duty Performance level and fire rating requirements.
- F. Positive Pressure Doors:
 1. Where UL 10C standards for positive pressure apply, doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.
 2. Smoke Gasketing: Apply smoke gasketing around frame perimeter and between door and pairs to meet Smoke (S) rating.
 3. Intertek/Warnock Hersey Category A Guidelines: Edge sealing systems not allowed on frames.
- G. Transom Panels: Same construction and finish as door; same performance rating as door.

2.04 HPDL CLAD DOORS; 45-, 60-, AND 90-MINUTE FIRE-RATED

- A. Door Types (VTI; Heritage Collection): 5-Ply Flush Fire-Rated HPDL Doors; for ratings in excess of 20-minutes.

- B. Model Nos.: FD-45-HPDL-5, FD-45PP-HPDL-5, FD-60-HPDL-5, FD60PP-HPDL-5, FD-90-HPDL-5 and FD-90PP-HPDL-5.
- C. Door Thickness: 1-3/4 inches (44 mm).
- D. Door Facings:
 - 1. High Pressure Decorative Laminate Facing for Fire-Rated Doors: NEMA LD 3, HGF.
 - 2. Color or Wood Grain Pattern: As indicated on the Interior Finish Legend in the drawings.
- E. Door Edge Banding:
 - 1. PVC Edge Banding: 0.12-inch (3-mm) thick for vertical door edges, all doors.
 - a. Exception: Provide HDPL on the vertical edges of doors of fire-rated door pairs.
 - 2. Color: Manufacturer's standard for matching face laminate.
- F. Door Construction:
 - 1. Core:
 - a. Material: Fire Retardent Mineral Core (FD), 5-ply; core does not contain asbestos or added urea formaldehyde.
 - b. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
- G. Stiles and Rails:
 - 1. 45-minute rated doors: Provide structural composite lumber (SCL) stiles and rails
 - 2. 60- and 90-minute rated doors: Provide manufacturer's standard non-combustible material for stiles and rails.
- H. Blocking: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated as needed to eliminate through-bolting hardware.
- I. Positive Pressure:
 - 1. Where UL 10C standards for positive pressure apply, doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.
 - 2. Smoke Gasketing: Apply smoke gasketing around frame perimeter and between door and pairs to meet Smoke (S) rating.
 - 3. Intertek/Warnock Hersey Category B Guidelines: Edge sealing systems not allowed on frames.

2.05 LIGHT FRAMES AND GLAZING

- A. Product: VTI; Style #110 Metal Vision Frame.
 - 1. Material: Frame formed of 0.048-inch (1.2-mm) thick, cold-rolled steel sheet.
 - 2. Finish: Factory primed for field-applied paint finish.
 - 3. Glass Thickness: As scheduled.
- B. Glazing: Refer to Section 08 80 00.

2.06 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire rated doors.
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- C. Openings: Cut and trim openings through doors in factory.
 - 1. Light Openings: Trim openings with lite frame style indicated.
 - 2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

- D. Electrical Raceways: Provide clad wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in Section 08 71 00. Wire nut connections are not acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine locations to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not begin installation until unacceptable conditions are corrected.
- B. Ensure frames are solidly anchored, allowing no deflection when doors are installed.
- C. Ensure frames are plumb, level, square, and within tolerance.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
 - 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Install doors at locations indicated on the Drawings.
- C. Install doors plumb, level, and square.
- D. Install door hardware as specified in Section 08 71 00.
- E. Coordinate installation of doors with installation of frames, hardware, and glazing.

3.03 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Replace doors that do not comply with requirements. Doors may be repaired if work complies with requirements and shows no evidence of repair or refinishing.

3.04 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

3.05 PROTECTION

- A. Protect installed doors from damage during construction.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Wall and ceiling access door and frame units.

1.03 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting
- B. Division 23 - HVAC duct access doors.

1.04 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.
- D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. NFPA 252 or UL 10C for fire-rated access door assemblies installed vertically.
 - 2. Provide smoke gasketing for doors in 0 or 1 hour rated smoke partitions.

2.02 MANUFACTURERS

- A. Specified Manufacturer: Karp Associates, Inc..
- B. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. Acudor Products, Inc.
 - 2. J. L. Industries, Inc.
 - 3. Karp Associates, Inc.
 - 4. Milcor Inc.
- C. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

2.03 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, [Type 304] [Type 316].
Remove tool and die marks and stretch lines or blend into finish.

- D. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- E. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- F. Frame Anchors: Same type as door face.
- G. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.04 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
 - 1. Product: Karp, Model KDW. (Model DSC-214M for above ceiling or concealed areas with exposed flange type).
 - 2. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
 - 3. Locations: Wall and ceiling.
 - 4. Door Size: as required by location.
 - 5. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage.
 - a. Finish: Factory prime.
 - 6. Frame Material: Same material and thickness as door.
 - 7. Hinges: Manufacturer's standard.
 - 8. Hardware: Latch.
- B. Fire-Rated, Flush Access Doors with Exposed Flanges:
 - 1. Product: Karp, Model KRP-150-FR.
 - 2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer's standard-width exposed flange, proportional to door size.
 - 3. Locations: Wall or ceiling.
 - 4. Fire-Resistance Rating: Not less than that of adjacent construction.
 - 5. Temperature-Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
 - 6. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage.
 - a. Finish: Factory prime.
 - 7. Frame Material: Same material, thickness, and finish as door.
 - 8. Hinges: Manufacturer's standard.
 - 9. Hardware: Latch.
- C. Fire-Rated, Flush Access Doors with Concealed Flanges:
 - 1. Product: Karp Model KRP-350 FR.
 - 2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
 - 3. Locations: Wall.
 - 4. Fire-Resistance Rating: Not less than that of adjacent construction.
 - 5. Temperature-Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
 - 6. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage.
 - a. Finish: Factory prime.
 - 7. Frame Material: Same material, thickness, and finish as door.
 - 8. Hinges: Manufacturer's standard.
 - 9. Hardware: Latch.
- D. Hardware:
 - 1. Latch: Cam latch operated by screwdriver.

2.05 FABRICATION

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

- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 - 2. Provide mounting holes in frames for attachment of units to metal framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

2.06 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated Steel Finishes:
 - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

3.03 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 34 00
INTERIOR HEALTHCARE SLIDING DOOR SYSTEMS

P1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Interior Aluminum-Framed Top-Hung Sliding Doors

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 08 14 23 - Plastic Laminate Wood Doors
- C. Section 08 71 00 - Door Hardware
- D. Section 09 21 16 - Gypsum Board Assemblies

1.04 DEFINITIONS

- A. Interior Healthcare Sliding Door System (from here on referred to as "Sliding Door") shall refer to the packaged sliding door system including doors, overhead track, and accessories required for a complete installation.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including installation instructions.
- B. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, hardware, finish, options, and accessories. Shop Drawings to show required blocking by others.
- C. Samples: Submit manufacturer's samples of the following sliding door components:
 - 1. Door veneer or laminate sample.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Warranty Documentation: Submit manufacturer's standard warranty.

1.06 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of sliding door assembly.
- B. Source: Obtain sliding aluminum framed doors and hardware from single source.
- C. Manufacturer's Qualifications: Manufacturer regularly engaged for past 5 years in manufacture of sliding doors similar to that specified.

1.07 PERFORMANCE

- A. Aluminum perimeter frames with integral acoustic seals.
- B. Soft self-closing mechanism integrated with top track.
- C. Concealed door guide.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Notify manufacturer immediately of any shipping damage.
- C. Store and handle materials in accordance with manufacturer's instructions.
- D. Keep materials in manufacturer's original, unopened containers and packaging until installation.

- E. Protect materials and finish during storage, handling, and installation to prevent damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: AD SYSTEMS
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 INTERIOR HEALTHCARE SLIDING DOOR SYSTEM

- A. Manufacturer:
 - 1. Product: AD Systems; ExamSlide™ High Performance Sliding Door System, no substitutions.
- B. Wall Thickness: 4-7/8 inches, unless otherwise indicated.
- C. Frame Profiles: Extruded aluminum frame "wrap" frame with integral vertical jamb (stile pocket).
- D. Aluminum Finish/Color: Sequin 789G048 (Standard to match clear anodized)
- E. Door Leafs. All Doors to be factory machined for hardware including pilot and function holes.
 - 1. Plastic Laminate Clad Wood Door: Reference Section 08 14 23 for requirements.
 - a. Thickness: 1-3/4 inches.
- F. Door Components:
 - 1. Single Top Track: Extruded aluminum track by AD Systems
 - 2. Valances: Extruded aluminum with integral end caps
 - a. Finish: Clear anodized aluminum.
 - 3. Top Rollers: tandem nylon roller sized to match door weight.
 - 4. Concealed Floor Guide: Integral Jamb floor guide by manufacturer.
 - 5. Soft-Closer: Soft and self-closing damper mechanism at both sides of door leaf.
 - 6. Pull Handles:
 - a. Ladder Pull: 16-inches long x 1-inch diameter.
 - 1) Finish: US32D Satin Stainless Steel.
- G. Hardware:
 - 1. Door Locks: Where indicated in door hardware schedule, and Section 08 71 00.
 - a. Mortise Latch and Lock Options:
 - 1) Type ADA-2: Thumb-turn with Indicator & 16-inch Ladder Pull.
 - 2. Self-Closing Spring Mechanism.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine wall openings to receive sliding doors for plumb, level, and square. Note: Finish door operation will be affected by out of tolerance framing.
- B. Verify dimensions of wall openings.
- C. Examine surfaces to receive top and bottom guide.
- D. Notify Architect of conditions that would adversely affect installation or subsequent use of sliding doors.
- E. Do not begin installation until unacceptable conditions are corrected.
- F. Base of door side to be flush or minimal. Rubber Base acceptable.

3.02 INSTALLATION

- A. Install sliding doors in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Sliding doors shall be plumb, level, square, and in proper alignment.
- C. Install sliding doors to close against walls without gaps.
- D. Install sliding doors to open and close smoothly.

3.03 ADJUSTING

- A. Adjust sliding doors for proper operation in accordance with manufacturer's instructions.
- B. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

3.04 CLEANING

- A. Clean sliding doors promptly after installation in accordance with manufacturer's instructions.

3.05 PROTECTION

- A. Protect installed sliding doors from damage until Substantial Completion.

END OF SECTION

SECTION 08 36 13
OVERHEAD SECTIONAL DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Overhead sectional door electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

1.03 RELATED REQUIREMENTS

- A. Section 04 20 00 - Brick and Masonry Construction
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 92 00 - Joint Sealants
- D. Section 08 71 00 - Door Hardware
- E. Division 26 - Electrical

1.04 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- C. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- D. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- E. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; 2011.
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Samples: Submit two panel finish samples, 6 by 6 inch (___ by ___ mm) in size, illustrating color and finish.
- E. Operation Data: Include normal operation, troubleshooting, and adjusting.
- F. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

1.06 QUALITY ASSURANCE

- A. Comply with applicable code for motor and motor control requirements.
- B. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.07 WARRANTY

- A. Warranty: Manufacturer's limited door and operators System warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Overhead Door Corporation.
- B. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. C.H.I. Overhead Doors
 - 2. Clopay Building Products
 - 3. Raynor Garage Doors
 - 4. Wayne-Dalton
 - 5. Cornell, Inc.
 - 6. Cookson Company
- C. Substitutions: Not permitted.

2.02 INSULATED SECTIONAL OVERHEAD DOORS

- A. Basis of Design Product: Overhead Door; Series 596 Thermacore Insulated Steel Doors.
- B. Steel Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Door Assembly: Metal/foam/metal sandwich panel construction, with PVC thermal break and weather-tight ship-lap design meeting joints.
 - a. Panel Thickness: 2 inches (51 mm).
 - b. Exterior Surface: Flush, textured.
 - c. Exterior Steel: 20 gauge, galvanized.
 - d. End Stiles: 16 gauge with thermal break.
 - e. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable. Sized with a minimum 7 to 1 safety factor.
 - 1) Standard cycle spring: 10,000 cycles.
 - f. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
 - 2. Thermal Transmittance: U-factor (Usi-factor) of 0.057 Btu/hr sq ft degrees F (___ W/sq m K), maximum, in accordance with DASMA 102; R-value of 17.40.
 - 3. Air Infiltration: 0.08 cfm at 15 mph; 0.08 cfm at 25 mph.
 - 4. Sound Transmission: Class 26.
 - 5. Operation:
 - a. Electric Motor Operation.
- C. Door Panels: Steel construction; outer steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flush profile; inner steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flat profile; core reinforcement 16-gauge sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.

2.03

2.04 STEEL DOORS

- A. Product: Overhead Door; Series 596 Thermacore Insulated Steel Doors.

- B. Description: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
 - 2. Door Nominal Thickness: 2 inches (51 mm) thick.
 - 3. Thermal Transmittance: U-factor (U-value) of 0.057 Btu/hr sq ft degrees F (___ W/sq m K), maximum, in accordance with DASMA 102; R-value of 17.4.
 - 4. Air Leakage Rate: Less than 0.40 cfm/sf (2.0 L/sec/sq m) when tested in accordance with ASTM E283 at test pressure difference of 1.57 psf (75 Pa).
 - 5. Air Infiltration: 0.08 cfm at 15 mph; 0.08 cfm at 25 mph.
 - 6. Sound Transmission: Class 26.
- C. Door Panels: Steel construction; outer steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flush profile; inner steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flat profile; core reinforcement 16-gauge sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.
 - 1. Door Nominal Thickness: 2 inches (51 mm) thick.
 - 2. Finish:
 - a. Exterior Finish: Factory finished with acrylic baked enamel; color as selected by Architect.
 - b. Interior Finish: Factory finished with acrylic baked enamel; color as selected from manufacturers standard line.
- D. Glazed Lights: Full panel width, one row; set in place with resilient glazing channel.
 - 1. Glazing: Annealed float glass; single pane; clear; 1/8 inch (3.2 mm) thick.
- E. Operation:
 - 1. Electric Operation: Electric control station.

2.05 COMPONENTS

- A. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
- B. Track Configuration: Lift Clearance Track.
- C. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- D. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
- E. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- F. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- G. Head Weatherstripping: EPDM rubber seal, one piece full length.
- H. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- I. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.
- J. Door Operator: Refer to "Door Operator" Article this Section.

2.06 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Float Glass: Provide float glass glazing, unless noted otherwise.
 - 1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).

- C. Insulation: Foamed-in-place polyurethane, bonded to facing.

2.07 ELECTRIC OPERATION

- A. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
- B. Product: Overhead Door; Model RSX Door Operator.
- C. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
1. Provide interlock switches on motor operated units.
 2. Provide tamperproof operation cycle counter.
- D. Electric Motor: Intermittent-duty, with instant reverse and automatic reset thermal overload. UL listed.
1. Motor Rating: As recommended by manufacturer for size and weight of door.
 2. Motor frame comply with:
 - a. NEMA 48 for 1/2 hp single phase.
 - b. NEMA 56 for 1/2 hp three phase.
 - c. NEMA 56 3/4 and 1 hp all phases.
 3. Construction:
 - a. Open drip-proof construction.
 4. Reduction: Primary reduction is SuperBelt, an auto tension poly-V flex belt that does not require adjustment. Secondary reduction is by chain and sprocket.
 5. Duty cycle: Accommodate standard usage, up to 60 cycles per hour during peak usage periods.
 - a. Brake: DC Disc type with selectable Progressive Braking for smooth stopping.
 - b. Clutch: Adjustable friction disc type.
 - c. Limit System: LimitLock limit system, magnetic type providing absolute positioning with push to set and remote setting capabilities. Limit System shall remain synchronized with the door during manual operation and supply power interruptions.
- E. Release:
1. Release shall be a pull and hold type mechanism with single cable operation and an integrated interlock switch on hoist units.
 2. Release shall consist of a manual disconnect door arm on trolley units.
- F. Hoist: Chain hoist consists of chain pocket wheel, chain guard and smooth hand chain on hoist units.
- G. Entrapment Protection: Required for momentary contact, includes radio control operation.
1. Control system shall have provisions to connect monitored entrapment protection devices such as monitored electric sensing edge, or monitored photo-eye and to provide constant contact close control operation in lieu of such devices.
 2. Photoelectric sensors monitored to meet UL 325/2010.
- H. Secondary Reversal:
1. Trolley version only. When the clutch is detected slipping in the close direction the operator will reverse the door to the open limit. For door/operator protection only not intended for entrapment
 2. Control system designed to accept an optional non-monitored external reversing device.
- I. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- J. Control System: Microprocessor based with relay motor controls on a single board. System incorporates a 16-character Liquid Crystal Display (LCD) to display the system status. System shall include the following:
1. Capable of monitoring and reporting on a variety of operating conditions, including: Current operating status, Current command status, Motor movement status, Current error status (if

- applicable), Hoist Interlock status (if applicable), External Interlock status, and 24VDC status.
- 2. A delay-on-reverse operating protocol.
- 3. Maximum run timers in both directions of travel that limit motor run time in the event a clutch slips or some other problem occurs.
- 4. Provisions for the connection of a 2-wire monitored photo-eye or a 2-wire monitored edge sensor, as well as non-monitored 2-wire sensing edges, photo-eyes or other entrapment protection devices.
- 5. Control action will be constant contact close until a monitored entrapment device is installed, allowing for selection of momentary contact.
- 6. Provisions for connection of single and/or 3-button control stations.
- 7. Provisions for connection of an external 3-wire radio controls and related control devices.
- 8. On board open, close and stop control keys for local operation.
- 9. Trolley operators with an inherent secondary reversal system.
- 10. CodeDodger radio receiver that is dual frequency cycling at 315 Mhz and 390 Mhz capable of storing 250 single button and/or 250 Open-Close-Stop transmitters with the ability to add and/or delete transmitters individually, identify and store activating transmitter IDs.
- K. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 - 1. 24 volt circuit.
 - 2. Surface mounted, at interior door jamb.
 - 3. Refer to "Entrapment Protection" Article this Section.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

3.03 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- F. Install perimeter trim.

3.04 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch (1.5 mm).
- B. Maximum Variation from Level: 1/16 inch (1.5 mm).
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch (3 mm) from 10 ft (3 m) straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.06 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 42 29
AUTOMATIC ENTRANCES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Exterior and interior, packaged power-operated sliding automatic entrances, bi-parting.
- B. Exterior and interior, packaged power-operated sliding automatic entrances, telescopic.
- C. Controllers, actuators and safety devices.
- D. Maintenance.

1.03 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 04 20 00 - Brick and Concrete Masonry
- C. Section 06 10 00 - Rough Carpentry
- D. Section 07 92 00 - Joint Sealants
- E. Section 08 80 00 - Glazing
- F. Section 09 21 16 - Gypsum Board Assemblies
- G. Division 26 Sections for electrical connections provided separately, including conduit and wiring, for power to automatic entrances.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Provide automatic entrance door assemblies capable of withstanding loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).
- C. Opening-Force Requirements for Egress Doors: Force shall be adjustable; but, not more than 50 lbf (222 N) required to manually set swinging egress door panel(s) in motion.
- D. Closing-Force Requirements: Not more than 30 lbf (133 N) required to prevent door from closing.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For automatic entrances. Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
 - 3. Activation and safety devices.
 - 4. Include hardware schedule and indicate hardware types, functions, quantities, and locations.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

- D. Delegated-Design Submittal: For automatic entrances indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Design Calculations: Calculate requirements for seismic restraints.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer and certified inspector.
- B. Product Certificates: For each type of emergency-exit automatic entrance, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for automatic entrances.
- D. Field quality-control reports.
- E. Warranties: Sample of special warranties.

1.07 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For automatic entrances, safety devices, and control systems to include in maintenance manuals.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience, and a member of AAADM.
 - 1. A qualified manufacturer with a manufacturing facility certified under ISO 9001.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience and approved by manufacturer.
 - 1. Certified by AAADM.
- C. Manufacturer shall have in place a national service dispatch center providing 24 hours a day, 7 days a week, emergency call back service.
- D. Certifications: Automatic door systems shall be certified by the manufacturer to meet performance design criteria in accordance with ANSI / BHMA A156.10, NFPA 101, UL 325, 2018 International Building Code (IBC).
- E. Source Limitations: Obtain automatic entrance door assemblies through one source from a single manufacturer.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- G. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrances serving as a required means of egress.

1.09 PROJECT CONDITIONS

- A. Field Measurements: Contractor shall verify openings to receive automatic entrance door assemblies by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed sliding tracks that control automatic entrances. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Templates: Obtain templates for doors, frames, and other work specified to be factory prepared for installing automatic entrances, and distribute to parties involved. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic entrances to comply with indicated requirements.
- C. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.

- D. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access-control system.

1.11 WARRANTY

- A. Automatic Entrances shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.
- B. During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.
- C. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours

1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of automatic entrance Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
 - 1. Engage a certified inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.
 - 3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sliding Automatic Entrance Door Assemblies:
 - 1. Specified Manufacturer: Stanley Access Technologies.
 - 2. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. ASSA ABLOY Entrance Solutions
 - b. DORMA USA, Inc.
 - c. Horton Automatics
 - d. NABCO Entrances, Inc.
 - e. Record-USA

2.02 SLIDING AUTOMATIC ENTRANCES, GENERAL

- A. Power Operated Doors: Provide products that comply with NFPA 101 and requirements of authorities having jurisdiction; provide equipment selected for actual door weight and for light pedestrian traffic, unless otherwise indicated.
- B. Packaged Door Assemblies: Provide components by single manufacturer, factory-assembled, including doors, frames, operators, actuators, and safeties.
- C. Performance:
 - 1. Air Leakage: Maximum of 1.0 cu ft/min/sq ft (5.0 L/s/sq m) of wall area, when tested in accordance with ASTM E283 at 1.57 lbs/sq ft (75 Pa) pressure differential across assembly.
 - 2. Wind-Borne-Debris Resistance: Where indicated, provide identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 4 - Additional Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
- D. Sliding Doors with Full Power Operators: Comply with BHMA A156.10; safeties required; provide break-away operation unless otherwise indicated; in the event of break-away operation, interrupt power operation.

1. Comply with UL 325; acceptable evidence of compliance includes UL (DIR) or ITS (DIR) listing or test report by testing agency acceptable to authorities having jurisdiction.
2. Force Required to Swing Break-Away Panel: 50 pound-force (220 N), maximum, measured at 1 inch (25 mm) from the latch edge of the door at any point in the closing cycle.

2.03 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 1. Headers, stiles, rails, and frames: 6063-T6.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
 3. Sheet and Plate: ASTM B209.
- B. Sealants and Joint Fillers: Refer to Section 079200.

2.04 SLIDING AUTOMATIC ENTRANCES, BI-PARTING

- A. Bi-Parting Sliding Automatic Entrances: Designated in the Drawings (Sheet A4.1) as Door Elevation P.
- B. Product: Stanley; Dura-Glide™ 3000 Series sliding automatic entrances, Bi-Parting Sliding.
 1. General: Provide manufacturer's standard automatic entrance door assemblies including doors, sidelights, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.
 2. Bi-Parting Entrances:
 - a. Configuration: Two sliding leaves and two full sidelights.
 - b. Traffic Pattern: Two-way.
 - c. Emergency Breakaway Capability: Sliding leaves and sidelights.
 - d. Mounting: Between jambs.
- C. Comply with ADA Standards for egress requirements.
- D. Components:
 1. Framing Members: Provide manufacturer's standard extruded aluminum framing, reinforced as required to support imposed loads.
 - a. Nominal Sizes:
 - 1) Bi-Parting Sliding Doors: 1-3/4 inch (44.5 mm) wide by 4-1/2 inch (114.3 mm) deep.
 - b. Concealed Fastening: Provide concealed fastening pocket in framing, with continuous flush insert cover extending full length of each framing member.
 2. Door and Sidelight Construction: Heavy duty interlocked extruded aluminum tubular stile and rail sections, through-rod bolted construction with steel corner support at hinge stile of carrier-suspended swinging panels or mechanically fastened corners with welded reinforcing brackets to reduce sag in sliding or breakout mode.
 - a. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
 - b. Stile Design:
 - 1) Narrow stile, 2 inch (51 mm), nominal width.
 - c. Top Rail Height: 5 inch (127 mm), nominal.
 - d. Center Rail (Muntin Bar) Height: 4-1/4 inch (108 mm), nominal.
 - e. Bottom Rail Height: 6 inch (152 mm), nominal.
 3. Glazing: Factory glazed.
 - a. Glazing Type: 1/4-inch (13-mm), tempered, 5/8-inch (16-mm), insulating, or 1-inch (25-mm), insulating.
 - b. Glazing Stops: Manufacturer's standard snap-on extruded aluminum square stops with preformed resilient glazing gaskets.
 4. Headers: Fabricated from extruded aluminum and extending full width of automatic entrance door units to conceal door operators, carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

5. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch (3 mm); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track.
6. Thresholds: All thresholds to conform to details and requirements for code compliance.
 - a. Standard square extrusion track under sidelights, for recessed installation; no threshold under sliding opening.
7. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
8. Signage: Provide signage in accordance with ANSI/BHMA A156.10.

2.05 SLIDING AUTOMATIC ENTRANCES, TELESCOPIC

- A. Bi-Parting Sliding Automatic Entrances: Designated in the Drawings (Sheet A4.1) as Door Elevation R.
- B. Product: Stanley; Dura-Glide™ 5300 Series sliding automatic entrance system, 3-Panel Telescopic.
 1. General: Provide manufacturer's standard automatic entrance door assemblies including doors, sidelights, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.
 2. Telescopic Entrances:
 - a. Configuration: Two sliding leaves and one full sidelight.
 - b. Traffic Pattern: Two-way.
 - c. Emergency Breakaway Capability: Sliding leaves and sidelight.
 - d. Mounting: Between jambs.
- C. Components:
 1. Framing Members: Provide manufacturer's standard extruded aluminum framing, reinforced as required to support imposed loads.
 - a. Nominal Size: 1-3/4 inch (44.5 mm) wide by 6 inch (152 mm) deep.
 - b. Concealed Fastening: Provide concealed fastening pocket in framing, with continuous flush insert cover extending full length of each framing member.
 2. Stile and Rail Doors and Sidelight: Manufacturer's standard glazed doors with extruded-aluminum tubular stile and rail members. Incorporate concealed tie-rods that span full length of top and bottom rails.
 - a. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
 - b. Stile Design:
 - 1) Narrow stile, 2 inch (51 mm), nominal width.
 - c. Top Rail Height: 5 inch (127 mm), nominal.
 - d. Center Rail (Muntin Bar) Height: 4-1/4 inch (108 mm), nominal.
 - e. Bottom Rail Height: 6 inch (152 mm), nominal.
 3. Glazing: Factory Glazed:
 - a. Glazing Type: 1-inch (25-mm), insulating.
 - b. Glazing Stops: Manufacturer's standard snap-on extruded aluminum square stops with preformed resilient glazing gaskets.
 4. Headers: Fabricated from extruded aluminum and extending full width of automatic entrance door units to conceal door operators, carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
 - a. Mounting: Concealed, with one side of header flush with framing.
 - b. Capacity: Capable of supporting up to 220 lb (100 kg) per panel, up to four panels, over spans up to 14 feet (4.3 m) without intermediate supports.
 5. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch (3 mm); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track.
 6. Threshold: All thresholds to conform to details and requirements for code compliance.
 - a. Continuous standard tapered extrusion double bevel.
 - b. Continuous standard square extrusion, for recessed installation.

2.06 DOOR OPERATORS

- A. General: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, operation under normal traffic load for type of occupancy indicated.
- B. Electromechanical Operators: Self-contained overhead unit powered by a minimum of 1/4 horsepower, permanent-magnet DC motor with gear reduction drive, microprocessor controller; and encoder.
 - 1. Operation: Power opening and power closing.
 - 2. Features:
 - a. Adjustable opening and closing speeds.
 - b. Adjustable open check and close check speeds.
 - c. Adjustable hold-open time between 0 and 30 seconds.
 - d. Obstruction recycle.
 - e. On/Off switch to control electric power to operator.
 - f. Energy conservation switch that reduces door-opening width.
 - g. Closed loop speed control with active braking and acceleration.
 - h. Adjustable obstruction recycle time delay.
 - i. Self-adjusting stop position.
 - j. Self-adjusting closing compression force.
 - k. Onboard sensor power supply.
 - l. Onboard sensor monitoring.
 - m. Optional Switch to open/Switch to close operation.
 - n. Fire alarm interface, configurable to safely open or close the entrance on signal from fire alarm system.
 - 3. Mounting: Concealed.
 - 4. Drive System: Synchronous belt type.
- C. Electrical service to door operators shall be provided under Division 26 (Electrical). Minimum service to be 120 VAC, 5 amps.

2.07 ELECTRICAL CONTROLS

- A. Electrical Control System: Electrical control system shall include a microprocessor controller and a high-resolution position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position and speed.
 - 1. The high-resolution encoder shall have a resolution of not less than 1024 counts per revolution. Systems utilizing external magnets and magnetic switches are not acceptable.
 - 2. Electrical control system shall include a 24 VDC auxiliary output rated at 1 amp.
- B. Performance Data: The microprocessor shall collect, and store performance data as follows:
 - 1. Counter: A non-resettable counter to track operating cycles.
 - 2. Event Reporting: Unit shall include non-volatile event and error recording including number of occurrences of events and errors, and cycle count of most recent events and errors.
 - 3. LED Display: Display presenting the current operating state of the controller.
- C. Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:
 - 1. Automatic Reset Upon Power Up.
 - 2. Main Fuse Protection.
 - 3. Electronic Surge Protection.
 - 4. Internal Power Supply Protection.
 - 5. Resettable sensor supply fuse protection.
 - 6. Motor Protection, over-current protection.
- D. Soft Start/Stop: A "soft-start" "soft-stop" motor driving circuit shall be provided for smooth normal opening and recycling.

- E. Obstruction Recycle: Provide system to recycle the sliding panels when an obstruction is encountered during the closing cycle. If an obstruction is detected, the system shall search for that object on the next closing cycle by reducing door closing speed prior to the previously encountered obstruction location, and will continue to close in check speed until doors are fully closed, at which time the doors will reset to normal speed. If obstruction is encountered again, the door will come to a full stop. The doors shall remain stopped until obstruction is removed and operate signal is given, resetting the door to normal operation.
- F. Programmable Controller: Microprocessor controller shall be field programmable.
 - 1. The following parameters may be adjusted:
 - a. Operating speeds and forces as required to meet specified ANSI/BHMA standard.
 - b. Adjustable and variable features specified.
 - c. Reduced opening position.
- G. Manual programming shall be available through local interface which has a two-digit display with a selection control including three push buttons.

2.08 ACTIVATION AND SAFETY DEVICES

- A. Combined Activation and Safety Sensors: Combined activation and safety sensors shall, in a single housing, detect motion and presence in accordance with ANSI / BHMA A156.10. Motion shall be detected using K-band microwave technology, presence by active infrared reflection technology.
- B. Photoelectric Beams: In addition to the threshold sensor include a minimum of two (2) doorway holding beams. Photoelectric beams shall be pulsed infrared type, including sender receiver assemblies for recessed mounting.
- C. Presence Sensor Monitoring: Sliding automatic entrances control system shall include a means to verify the functionality of all active presence sensors in accordance with ANSI / BHMA A156.10. A detected fault shall cause automatic operation to cease until the fault is corrected.

2.09 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance door and hardware manufacturers for entrances and uses indicated.
- B. Emergency Breakaway Feature: Provide release hardware that allows panel(s) to swing out in direction of egress to full 90 degrees from any position in sliding mode. Maximum force to open panel shall be 50 lbf (222 N) according to ANSI / BHMA A156.10. Interrupt powered operation of panel operator while in breakaway mode.
- C. Deadlocks: Manufacturer's standard deadbolt operated by exterior cylinder and interior thumb turn; with minimum 1 inch (25 mm) long throw bolt; ANSI / BHMA A156.5, Grade 1.
 - 1. Cylinders: As specified in Section 08 71 00 - Door Hardware.
 - 2. Hook Latch: Laminated-steel hook, mortise type, BHMA A156.5, Grade 1.
 - 3. Two-Point Locking: On bi-parting entrances, provide locking system that incorporates a device in the stile of active door leaves that automatically extends a flush bolt into overhead carrier assembly.
- D. Control Switch: Provide manufacturer's standard header mounted rocker switches and door position switch to allow for full control of the automatic entrance door.
- E. Power Switch: Sliding automatic entrances shall be equipped with a two position On/Off rocker switch to control power to the door.
- F. Sliding Weather Stripping: Manufacturer's standard replaceable components complying with AAMA 701/702; made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- G. Weather Sweeps: Manufacturer's standard adjustable nylon brush sweep mounted to underside of door bottom.

2.10 FABRICATION

- A. General: Factory fabricates automatic entrance door assembly components to designs, sizes, and thickness indicated and to comply with indicated standards.
 - 1. Form aluminum shapes before finishing.
 - 2. Use concealed fasteners to greatest extent possible.
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
- B. Framing: Provide automatic entrances as prefabricated assemblies.
 - 1. Fabricate tubular and channel frame assemblies with manufacturer's standard mechanical or welded joints. Provide sub-frames and reinforcement as required for a complete system to support required loads.
 - 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 3. Form profiles that are sharp, straight, and free of defects or deformations.
 - 4. Prepare components to receive concealed fasteners and anchor and connection devices.
 - 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated.
- F. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site.

2.11 ALUMINUM FINISHES

- A. General: Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by Aluminum Association for designing finishes.
 - 1. [Class II, Clear Anodic Finish: AA-M12C22A31 Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.40 mils minimum complying with AAMA 611-98, and the following:
 - a. AAMA 607.1
 - 2. Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.]

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine conditions for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce joints free of burrs and distortion. Rigidly secure non-movement joints.
- B. Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
- C. Install equipment in accordance with manufacturer's instructions.

- D. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections.
- E. Sealants: Comply with requirements specified in Section 07 92 00.

3.03 FIELD QUALITY CONTROL

- A. Testing Services: Factory Trained Installer shall test and inspect each automatic entrance door to determine compliance of installed systems with applicable ANSI standards.

3.04 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation, for tight closure, and complying with requirements in ANSI / BHMA A156.10.

3.05 CLEANING

- A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

3.06 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

3.07 DEMONSTRATION

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

SECTION 08 42 43
MANUAL SLIDING BREAK-AWAY ICU/CCU DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Interior, 3-panel telescoping manual sliding ICU/CCU entrances; trackless.
- B. Entrance system shall be rated as an effective barrier limiting the passage of smoke.

1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 07 92 00 - Joint Sealants
- C. Section 08 71 00 - Door Hardware
- D. Section 08 42 29 - Automatic Entrances
- E. Section 08 71 00 - Door Hardware
- F. Section 08 80 00 - Glazing
- G. Section 09 21 16 - Gypsum Board Assemblies

1.04 DEFINITIONS

- A. Packaged Sliding Entrance Door System (from here on referred to as "Entrance System") shall refer to packaged sliding entrance system including doors, sidelights, framing, headers, carrier assemblies, roller tracks, pivots, and accessories required for a complete installation.
- B. SX Panel: Sliding panel that swings open upon pushing.
- C. SO Panel: Sidelight panel, normally stationary, that will swing open upon pushing.
- D. X Panel: Sliding panel unable to swing.
- E. O Panel: Sidelight panel unable to swing.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Provide Entrance System capable of withstanding structural loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).
- C. Smoke and Draft Control: Provide smoke and draft control system on specified doors. Smoke and draft control system shall provide an effective barrier for limiting the passage of smoke through the entrance system, and shall comply with the following:
 - 1. The maximum air leakage rate shall be 3.0 ft³/min/ft² (0.9 m³/min/m²) of door opening at 0.30 in water column (75 Pa) for both the ambient and elevated temperature tests.
 - 2. Entrance System shall be tested in accordance UL 1784.
 - 3. Installation shall be in accordance with NFPA 105.

1.06 SUBMITTALS

- A. Product Data: Manufacturer's catalog data, detail sheets, and specifications.
- B. Shop Drawings: Prepared specifically for this project; show dimensions of doors, sidelights, details of construction, and interface with other products.
- C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

- E. Closeout Submittals:
 - 1. Operating and Maintenance Data: Operating and maintenance instructions, and parts lists.
 - 2. Warranties.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative, with certificate issued by AAADM, who is trained for installation and maintenance of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer with a manufacturing facility certified under ISO 9001.
- C. Manufacturer shall have in place a national service dispatch center providing 24 hours a day, 7 days a week, emergency call back service.
- D. Certifications: Entrance System provided as an effective barrier against the passage of smoke shall be UL 1784 listed.
- E. Source Limitations: Obtain Entrance System through one source from a single manufacturer.
- F. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of Entrance System and are based on the specific system indicated.

1.08 PROJECT CONDITIONS

- A. Field Measurements: Contractor shall verify openings to receive entrance systems by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Mounting Surfaces: Contractor shall verify all surfaces to be plumb, straight and secure; substrates to be of proper dimension and material.
- C. Other trades: Contractor shall advise of any inadequate conditions or equipment.

1.09 COORDINATION

- A. Templates: Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing entrance system to comply with indicated requirements.

1.10 WARRANTY

- A. Entrance System shall be warranted to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.
 - 1. During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.
 - 2. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Stanley Access Technologies.
 - 1. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. ASSA ABLOY Entrance Solutions
 - b. Horton Automatics (Overhead Door Corporation).
 - c. NABCO Entrances, Inc
 - d. Record-USA.

2.02 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Headers, stiles, rails, and frames 6063-T6.
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
 - a. Sheet and Plate: ASTM B209.
- B. Sealants and Joint Fillers: As specified in Section 07 92 00.

2.03 ENTRANCE SYSTEM

- A. Entrance System: Designated in the Drawings (Sheet A4.1) as Door Elevation S.
- B. Product: Stanley; Dura-Care™ 7500TL-FBO Series, manual sliding entrance system.
 - 1. General: Provide manufacturer's standard entrance system including doors, sidelights, framing, headers, carrier assemblies, roller tracks, pivots, and accessories required for a complete installation.
 - 2. Telescopic Entrances:
 - a. Configuration: Two sliding panels and one full sidelight; telescoping.
 - b. Traffic Pattern: Two-way.
 - c. Breakaway Capability: Sliding panels and sidelight, from fully open position.
 - d. Mounting: Between jambs.
 - e. Floor Track Configuration: Trackless.

2.04 COMPONENTS

- A. Framing Members: Manufacturer's standard extruded aluminum reinforced as required to support imposed loads.
 - 1. Nominal Size: 1-3/4 inch by 6 inch (45 by 152 mm).
 - 2. Concealed Fastening: Framing shall incorporate a concealed fastening pocket, and continuous flush insert cover, extending full length of each framing member.
- B. Stile and Rail Doors and Sidelights: Manufacturer's standard 1-3/4 inch (45 mm) thick glazed doors with extruded-aluminum tubular stile and rail members. Incorporate concealed tie-rods that span full length of top and bottom rails.
 - 1. Glazing Stops and Gaskets: Snap-on, extruded-security aluminum stops and preformed gaskets.
 - 2. Stile Design: Narrow stile; 2 inch (51 mm) nominal width.
 - 3. Bottom Rail Design: 6 inch (152 mm), nominal.
 - 4. Muntin Bars: None.
- C. Glazing: 1-inch thick insulated glazing unit that supports installation of integral blinds between the two panes of 1/4-inch tempered glass. Glazing provided by manufacturer.
- D. Headers: Fabricated from extruded aluminum and extending full width of entrance units to conceal carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door carrier assemblies. Secure panels to prevent unauthorized access. Mounting shall be concealed, flush with framing.
- E. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch (3 mm); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track.
- F. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

2.05 ACCESSORIES

- A. Integrated Blinds:
 - 1. Manually controlled via a knob from outside of the room.

2.06 HARDWARE

- A. General: Provide units in sizes and types recommended by entrance system and hardware manufacturers for entrances and uses indicated.
- B. Breakaway Feature: Provide release hardware that allows panel(s) to swing out in direction of egress to full 90 degrees. Maximum force to open panel shall be 50 lbf (222 N) with panel retaining bolts released. Limit arms shall be provided to control swing of non-sliding panels on break-out; swing shall not exceed 90 degrees.
- C. Positive Latch: Manufacturer's standard non-keyed, spring loaded, latch and strike that can secure sliding door panels to adjacent panels or jambs. Strike shall mount flush to surface of framing. Latch shall engage by closing action of door.

- D. Smoke Seal Components: Provide manufactures standard smoke and draft control components as required to meet performance specifications. Components included but are not limited to: Rubber stile, top rail, and hanger seals.
- E. Pulls: Provide manufacturer's standard flush cup pulls.

2.07 FABRICATION

- A. General: Factory fabricate entrance system components to designs, sizes, and thickness indicated and to comply with indicated standards.
 - 1. Form aluminum shapes before finishing.
 - 2. Use concealed fasteners to greatest extent possible.
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
- B. Framing: Provide entrance system as prefabricated assemblies.
 - 1. Fabricate tubular and channel frame assemblies with manufacturer's standard mechanical or welded joints. Provide sub-frames and reinforcement as required for a complete system to support required loads.
 - 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 3. Form profiles that are sharp, straight, and free of defects or deformations.
 - 4. Prepare components to receive concealed fasteners and anchor and connection devices.
 - 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated.
- E. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site.

2.08 ALUMINUM FINISH

- A. General: Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by Aluminum Association for designing finishes.
- B. Class II, Clear Anodic Finish: AA-M12C22A31 Clear Finish.
 - 1. AAMA 607.1
 - 2. Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine conditions for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of ICU/CCU entrances. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Where aluminum components will contact different metals, prior to installation paint contact surfaces with primer or apply sealant or tape recommended by manufacturer for protection against galvanic action.

- D. Where aluminum components will contact concrete or masonry, prior to installation paint contact surfaces with bituminous paint.

3.03 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce joints free of burrs and distortion. Rigidly secure non-movement joints.
- B. Entrances: Install entrance system plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
- C. Grounding: Connect ICU/CCU entrances to building grounding system as specified in Division 26 Sections.
- D. Sealants: Comply with requirements specified in Section 07 92 00.

3.04 FIELD QUALITY CONTROL

- A. Testing Services: Factory Trained Installer shall test and inspect each entrance system to determine compliance of installed systems with applicable standards.

3.05 ADJUSTING

- A. Adjust entrance system, and hardware for smooth and safe operation.

3.06 CLEANING

- A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

3.07 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

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 SECTION INCLUDES

- A. Mechanical door hardware for the following:
 - 1. Swinging doors.
- B. Cylinders for door hardware specified in other Sections.
 - 1. Electrified door hardware.

1.3 RELATED REQUIREMENTS

- A. Section 08 11 13 – Hollow Metal Doors and Frames
- B. Section 08 14 16 – Flush Wood Doors
- C. Section 08 14 23 – Plastic Laminate Clad Wood Doors
- D. Section 12 32 16 – Manufactured Plastic Laminate Faced Casework
- E. Division 26 - Electrical

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.
 - 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Samples for Verification: Only as may be requested by Architect. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
 - 1. Sample Size: Full-size units or minimum 2-by-4-inch (51-by-102-mm) Samples for sheet and 4-inch (102-mm) long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may,

after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
 - c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - d. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Door Hardware Index: Cross-referenced in Drawings.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For electrified door hardware, from the manufacturer.
 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 - 1. For door hardware, an Architectural Hardware Consultant (AHC) who is also an Electrified Hardware Consultant (EHC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- G. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.

- b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- I. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Inspect and discuss preparatory work performed by other trades.
 - 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 - 4. Review sequence of operation for each type of electrified door hardware.
 - 5. Review required testing, inspecting, and certifying procedures.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.8 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
- F. **SLH STANDARD: All door hardware shall be coordinated and in compliance with SLH Door and Door Hardware Master Specification Guide.**

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.

- b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- 2. Warranty Period: Three years from Date of Substantial Completion, unless otherwise indicated.
 - a. Electromagnetic and Delayed-Egress Locks: Five years from Date of Substantial Completion.
 - b. Exit Devices: Two years from Date of Substantial Completion.
 - c. Manual Closers: 10 years from Date of Substantial Completion.
 - d. Concealed Floor Closers: 10 years from Date of Substantial Completion.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide twelve months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

1.11 KEYING

- A. All locks shall have cores provided by the Owner and shall be keyed by the Owner for a Schlage "Primus" key system.
- B. All locks to be keyed into the existing Schlage "Primus" key system.
- C. Owner shall provide keys as required.
- D. Contractor shall provide construction security cores and keys for construction staff as required, for building perimeter doors.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 4 "Door Hardware Schedule" Article to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 - 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand Company.
 - c. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- D. Lock Trim:
 - 1. Dummy Trim: Match lever lock trim and escutcheons.
 - 2. Operating Device: Lever with escutcheons (roses).
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
- F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company.
- G. Interconnected Locks: BHMA A156.12; Grade 1; Series 5000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company.

2.4 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by the following:
 - a. Von Duprin; an Ingersoll-Rand company.

2.5 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

- a. IVES Hardware; an Ingersoll-Rand Company.

2.6 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

- a. Von Duprin; an Ingersoll-Rand Company.

2.7 LOCK CYLINDERS

- A. Provided by owner.

2.8 KEYING

- A. Provided by Owner

2.9 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

- a. IVES Hardware; an Ingersoll-Rand Company.

- b. Rockwood Manufacturing Company.

2.10 ACCESSORIES FOR PAIRS OF DOORS

- A. Astragals: BHMA A156.22.

2.11 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

- a. Product: Subject to compliance with requirements, provide product indicated on schedule by LCN Closers; an Ingersoll-Rand Company.

2.12 CONCEALED CLOSERS

- A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:

- a. LCN Closers; an Ingersoll-Rand Company.

- b. Rixson Specialty Door Controls; an ASSA ABLOY Group Company.

2.13 CLOSER HOLDER RELEASE DEVICES

- A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by smoke detection system or loss of power.
 - 1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. LCN Closers; an Ingersoll-Rand Company.

2.14 MECHANICAL STOPS AND HOLDERS

- A. Wall- Stops: BHMA A156.16; polished cast brass, or bronze, base metal.
 - 1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. IVES Hardware; an Ingersoll-Rand Company.
 - c. Rockwood Manufacturing Company.

2.15 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Refer to Divisions 26 and 28.

2.16 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
 - 1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Glynn-Johnson; an Ingersoll-Rand Company.
 - b. Rixson.

2.17 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Product: Subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. National Guard Products.
 - b. Pemko Manufacturing Co.; an ASSA ABLOY Group Company.
 - c. Reese Enterprises, Inc.

2.18 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. IVES Hardware; an Ingersoll-Rand Company.

- c. Rockwood Manufacturing Company.

2.19 PLASTIC PROTECTION PLATES

- A. Plastic Protection Plates: BHMA A156.6; fabricated with four sides beveled; rigid plastic; 0.060-inch- (1.5-mm-) thick, PVC or acrylic-modified vinyl plastic.
1. Product: Subject to compliance with requirements, provide Construction Specialties per plans:

2.20 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
- a. Wood or Machine Screws: For the following:
- 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
- b. Steel Through Bolts: For the following unless door blocking is provided:
- 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.21 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Steelcraft Steel Doors and Frames hardware installation standard, and if not listed, then Standard Steel Doors and Frames: ANSI/SDI A250.8.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.
 - 2. Furnish permanent cores to Owner for installation.
- E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated,. Verify location with Engineer.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Stops: Provide wall stops for doors unless overhead or other type stops are indicated in door hardware schedule.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

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

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

PART 4 - SCHEDULES

4.1 DOOR HARDWARE SCHEDULE

HARDWARE SET: 01

DOOR NUMBER:

02-1B142.2

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW NRP	630	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	99-EO	626	VON
1	EA	PANIC HARDWARE	99-L-NL-06	626	VON
1	EA	CYLINDER	BY OWNER	626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	ASTRAGAL (SET)	8195AA	AA	ZER
2	EA	DOOR SWEEP	8197AA	AA	ZER
1	EA	THRESHOLD	65A-223	A	ZER
2	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

HARDWARE SET: 02

DOOR NUMBER:

02-1B141E 02-1B078

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	630	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	LOCK GUARD	LG12	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
1	EA	DOOR SWEEP	8197AA	AA	ZER
1	EA	THRESHOLD	65A-223	A	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	LOW VOLTAGE POWER BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: 03

DOOR NUMBER:

2C-S01.1

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	630	IVE
1	EA	PANIC HARDWARE	99-NL	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS444	626	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
1	EA	DOOR SWEEP	8197AA	AA	ZER
1	EA	THRESHOLD	65A-223	A	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE

HARDWARE SET: 04

DOOR NUMBER:

02-2B201

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW NRP	630	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
1	EA	MEETING STILE	383AA	AA	ZER
2	EA	DOOR SWEEP	8197AA	AA	ZER
1	EA	THRESHOLD	65A-223	A	ZER
2	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

NOTE: INSTALL LOCK TO ALLOW FREE EGRESS FROM ROOF.

HARDWARE SET: 05

DOOR NUMBER:

02-1B00L

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	CONT. HINGE	112XY	628	IVE
1	EA	CLASSROOM LOCK	ND70LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP ST-1630	689	LCN
1	EA	TOP JAMB MTG PLATE	4040XP-18TJ	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			

HARDWARE SET: 06

DOOR NUMBER:

02-1B00O

02-1B00P

02-1B00Q

02-1B00S

02-1B007

02-1B118Y

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HWSC	652	IVE
2	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7850	689	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL (SET)	8193AA	AA	ZER

HARDWARE SET: 07

DOOR NUMBER:

02-1B00N 02-1B00R 02-1B118U

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW	652	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	RX-LC-9927-EO-F-LBR-499F	626	VON
1	EA	DELAYED EGRESS MAG	M490DEP 12/24 VDC	628	SCE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL (SET)	8193AA	AA	ZER
2	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-2RS-FA	LGR	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: CR SIDE: VALID CARD READ TEMPORARILY DISABLES DELAYED EGRESS MAG LOCK ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. NON CR SIDE: ACTUATOR OPENS DOOR. ALWAYS FREE EGRESS.

HARDWARE SET: 08

DOOR NUMBER:

02-1B118T

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW NRP	652	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	RX-LC-QEL-9927-EO-F-LBR-499F 24 VDC	626	VON
2	EA	DELAYED EGRESS MAG	M490DEP 12/24 VDC	628	SCE
1	EA	AUTO OPERATOR	4000 LE SERIES (PAIR)	689	HOR
1	EA	PRESENCE SENSOR	SUPERSCAN		BEA
2	EA	ACTUATOR	WALL ACTUATOR	630	HOR
2	EA	ARMOR PLATE	8402 34" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL (SET)	8193AA	AA	ZER
2	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	POWER SUPPLY	PS904 900-4RL-FA	LGR	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: VALID CARD READ TEMPORARILY DISABLES DELAYED EGRESS MAG LOCK ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

NOTE: MAG LOCKS CONTROL LOCKING. PANIC DEVICES NORMALLY DOGGED.

HARDWARE SET: 09 – NOT USED

HARDWARE SET: 10

DOOR NUMBER:

02-1B00W 02-1B009

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW NRP	652	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	RX-LC-QEL-9927-EO-F-LBR-499F 24 VDC	626	VON
1	EA	DELAYED EGRESS MAG	M490DEP 12/24 VDC	628	SCE
1	EA	AUTO OPERATOR	4000 LE SERIES (PAIR)	689	HOR
1	EA	PRESENCE SENSOR	SUPERSCAN		BEA
2	EA	ACTUATOR	WALL ACTUATOR	630	HOR
2	EA	ARMOR PLATE	8402 34" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL (SET)	8193AA	AA	ZER
2	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	POWER SUPPLY	PS904 900-4RL-FA	LGR	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: CR SIDE: VALID CARD READ TEMPORARILY DISABLES DELAYED EGRESS MAG LOCK ALLOWING EGRESS AND ACTUATOR TO FUNCTION. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. NON CR SIDE: ACTUATOR OPENS DOOR. ALWAYS FREE EGRESS.

NOTE: MAG LOCKS CONTROL LOCKING. PANIC DEVICES NORMALLY DOGGED.

HARDWARE SET: 11

DOOR NUMBER:

2C-S01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-LC-99-L-F-E996-06-FS 24 VDC	626	VON
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-2RS-FA	LGR	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	LOW VOLTAGE POWER BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY TO FLOOR VIA VALID CARD READ. ALWAYS FREE FOR EGRESS INTO STAIR.

HARDWARE SET: 12

DOOR NUMBER:

02-1B00.2

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-L-06	626	VON
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 (IF REQ'D)	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 (IF REQ'D)	689	LCN

HARDWARE SET: 13

DOOR NUMBER:

02-1B00J	02-1B068	02-1B079	02-1B082A	02-1B082B	02-1B084A
02-1B084B	02-1B086	02-1B092	02-1B097	02-1B101	02-1B103
02-1B108					

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HWSC	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	LOW VOLTAGE POWER BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: 14

DOOR NUMBER:

02-1B080

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HWSC	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	LOW VOLTAGE POWER BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: 15

DOOR NUMBER:

02-1B069

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HWSC	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	AUTO OPERATOR	4000 LE SERIES	689	HOR
1	EA	PRESENCE SENSOR	SUPERSCAN		BEA
1	EA	ACTUATOR	WALL ACTUATOR	630	HOR
1	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05	WHT	SCE
1	EA	NOTE	CARD ACCESS BY SECURITY		B/O
1	EA	NOTE	LOW VOLTAGE POWER BY SECURITY		B/O
1	EA	NOTE	WIRING DIAGRAM BY SECURITY		B/O

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ, RELEASING ELECTRIC STRIKE AND INITIATING AUTO OPERATOR CYCLE. ALWAYS FREE FOR EGRESS. EGRESS BY AUTO OPERATOR BY PRESSING INTERIOR ACTUATOR, FIRST RELEASING ELECTRIC STRIKE THEN INITIATING AUTO OPERATOR CYCLE.

HARDWARE SET: 16

DOOR NUMBER:

02-1B076 ~~02-1B078~~ 02-1B138.3 02-1B138.5 02-1B142.1 02-1B143

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 17

DOOR NUMBER:

02-1B075 02-1B138.1 02-1B138.2

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 18

DOOR NUMBER:

02-1B062

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW	652	IVE
1	EA	CONST LATCHING BOLT	FB51T	630	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP (INACTIVE LEAF)	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
2	EA	ASTRAGAL (SET)	8193AA	AA	ZER

HARDWARE SET: 19

DOOR NUMBER:

02-1B077A 02-1B077B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	630	IVE
1	EA	CLASSROOM LOCK	ND70LD RHO	626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	545A-223	A	ZER

HARDWARE SET: 20

DOOR NUMBER:

02-1B061 02-1B121 002A 002B 006A 006B
~~02-1B070~~ ~~02-1B071~~ ~~02-1B073~~ ~~02-1B074~~

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	ENTRANCE LOCK	ND53LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	8144SBK PSA	BK	ZER

HARDWARE SET: 21

DOOR NUMBER:

~~02-1B118W~~

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	ENTRANCE LOCK	ND53LD RHO	626	SCH
1	EA	CYLINDER	BY OWNER	626	SCH
1	EA	OH STOP	90S J	630	GLY
1	EA	GASKETING	8144SBK PSA	BK	ZER

HARDWARE SET: 22

DOOR NUMBER:

02-1B059A ~~02-1B094~~ ~~02-1B105~~

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255 SET	626	IVE
1	EA	HOSPITAL PRIVACY	ND44S RHO	626	SCH
1	EA	RESCUE STRIKE	455 5-3/4	26D	HAG
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 23

DOOR NUMBER:

02-1B012 02-1B094 02-1B105 02-1B00C.2 02-1B00C.3

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255 SET	626	IVE
1	EA	HOSPITAL PRIVACY	ND44S RHO	626	SCH
1	EA	RESCUE STRIKE	455 5-3/4	26D	HAG
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	MEETING STILE	8136 6" (152MM) PSA (APPLY AT GAP CREATED BY LOCK/STRIKE)		ZER
2	EA	SITE SEAL	398V	V	ZER

HARDWARE SET: 24

DOOR NUMBER:

00C.2A 00C.3A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255 SET	626	IVE
1	EA	HOSPITAL PRIVACY	ND44S RHO	626	SCH
1	EA	RESCUE STRIKE	455 5-3/4	26D	HAG
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 25

DOOR NUMBER:

02-1B081	02-1B083	02-1B085	02-1B087	02-1B089	02-1B091
02-1B093	02-1B095	02-1B096	02-1B098	02-1B100	02-1B102
02-1B104	02-1B106	02-1B107	02-1B110	02-1B111	02-1B112
02-1B113	02-1B114	02-1B115	02-1B116	02-1B117	02-1B118

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HWSC	652	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE SET: 26

DOOR NUMBER:

02-1B141A 02-1B141B 02-1B141C 02-1B141D

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	DOOR CONTACT	674-OH	628	SCE

NOTE: BALANCE OF HARDWARE BY DOOR MANUFACTURER

HARDWARE SET: 27

DOOR NUMBER:

02-1B070	02-1B071	02-1B072	02-1B073	02-1B074	02-1B081A
02-1B083A	02-1B085A	02-1B087A	02-1B089A	02-1B091A	02-1B093A
02-1B095A	02-1B096A	02-1B098A	02-1B100A	02-1B102A	02-1B104A
02-1B106A	02-1B107A	02-1B110A	02-1B111A	02-1B112A	02-1B113A
02-1B114A	02-1B115A	02-1B116A	02-1B117A	02-1B118A	

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	SLIDING DOOR	EXAMSLIDE SYSTEM, SECTION 08 34 00		ADS

HARDWARE SET: 28

DOOR NUMBER:

02-1B011	02-1B059	02-1B109
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EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
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NOTE: ALL HARDWARE BY DOOR MANUFACTURER

HARDWARE SET: 29

DOOR NUMBER:

02-1B00D.1	02-1B00D.2	02-1B140A	02-1B140C
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EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	CYLINDER	BY OWNER	626	SCH

NOTE: BALANCE OF HARDWARE BY DOOR MANUFACTURER

4.01 DOOR HARDWARE INDEX

DOOR NO.	SET NO.
00C.2A	24
00C.3A	24
02-1B00C.2	23
02-1B00C.3	23
02-1B00.2	12
02-1B00D.1	29
02-1B00D.2	29
02-1B00J	13
02-1B00L	05
02-1B00N	07
02-1B00O	06

DOOR NO.	SET NO.
02-1B00P	06
02-1B00Q	06
02-1B00R	07
02-1B00S	06
02-1B00W	10
02-1B007	06
02-1B009	10
02-1B011	28
02-1B012	23
02-1B059	28
02-1B059A	22
02-1B061	20
02-1B062	18
02-1B068	13
02-1B069	15
02-1B070	20
02-1B071	20
02-1B072	27
02-1B073	20
02-1B074	20
02-1B075	17
02-1B076	16
02-1B077A	19
02-1B077B	19
02-1B078	2
02-1B079	13
02-1B080	14
02-1B081	25
02-1B081A	27
02-1B082A	13
02-1B082B	13

DOOR NO.	SET NO.
02-1B083	25
02-1B083A	27
02-1B084A	13
02-1B084B	13
02-1B085	25
02-1B085A	27
02-1B086	13
02-1B087	25
02-1B087A	27
02-1B089	25
02-1B089A	27
02-1B091	25
02-1B091A	27
02-1B092	13
02-1B093	25
02-1B093A	27
02-1B094	23
02-1B095	25
02-1B095A	27
02-1B096	25
02-1B096A	27
02-1B097	13
02-1B098	25
02-1B098A	27
02-1B100	25
02-1B100A	27
02-1B101	13
02-1B102	25
02-1B102A	27
02-1B103	13

DOOR NO.	SET NO.
02-1B104	25
02-1B104A	27
02-1B105	23
02-1B106	25
02-1B106A	27
02-1B107	25
02-1B107A	27
02-1B108	13
02-1B109	28
02-1B110	25
02-1B110A	27

02-1B111	25
02-1B111A	27
02-1B112	25
02-1B112A	27
02-1B113	25
02-1B113A	27
02-1B114	25
02-1B114A	27
02-1B115	25
02-1B115A	27
02-1B116	25
02-1B116A	27
02-1B117	25
02-1B117A	27
02-1B118	25
02-1B118A	27
02-1B118T	08
02-1B118U	7
02-1B118W	21

DOOR NO.	SET NO.
02-1B118Y	06
02-1B121	20
02-1B138.1	17
02-1B138.2	17
02-1B138.3	16
02-1B138.5	16
02-1B140A	29
02-1B140B	30
02-1B140C	29
02-1B141A	26
02-1B141B	26
02-1B141C	26
02-1B141D	26
02-1B141E	02
02-1B142.1	16
02-1B142.2	01
02-1B143	16
02-2B201	04
002A	20
002B	20
2C-S01	11
2C-S01.1	03
006A	20
006B	20

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Glazing units, compounds and accessories.

1.03 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 08 14 23 - Plastic Laminate Clad Wood Doors
- C. Section 08 34 00 - Interior Healthcare Sliding Door Systems
- D. Section 08 36 13 - Overhead Sectional Doors
- E. Section 08 42 29 - Automatic Entrances
- F. Section 08 42 43 - Manual Sliding Break-Away ICU/CCU Doors
- G. Section 08 43 13 - Aluminum-Framed Entrances and Storefronts
- H. Section 08 81 17 - Fire-Rated Glass

1.04 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in inches according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Design glass, including comprehensive engineering analysis according to ICC's 2012 International Building Code by a qualified professional Missouri engineer, using the following design criteria:
 - 1. Design Wind Pressures:
 - a. 5 pounds per square foot (SF) for all interior glazing.
 - b. Exterior glazing shall be per ASCE 7-05 requirements for the various locations on the building based on basic nominal design 3-second gust wind speed of 90 miles per hour at 33 ft above ground for Exposure C category, adjusted to this project's conditions.
 - 1) Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 2) Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.

1.06 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.07 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glass Samples: For each type of glass product only if requested by Architect; 12 inches (300 mm) square.
- C. Glazing Accessory Samples: For gaskets sealants and spacers, in 12-inch (300-mm) lengths, only if requested by Architect.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.08 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installers and sealant testing agency.
- B. Product Certificates: For glass and glazing products, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for glazing sealants and glazing gaskets.
 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Warranties: Sample of special warranties.

1.09 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Source Limitations for Glass: Obtain laminated glass and clear glass from single source from single manufacturer for each glass type.
- F. Source Limitations for Glazing Accessories: Obtain tinted float glass, coated float glass, laminated glass and insulating glass from single source from single manufacturer for each product and installation method.
- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install glazing in mockups specified in Section 084113 "Aluminum-Framed Entrances and Storefronts"-and others with applied frost membrane patterns to match glazing systems required for Project, including glazing methods.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- L. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review temporary protection requirements for glazing during and after installation.

1.10 DELIVERY, STORAGE AND HANDLING

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

1.11 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.12 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

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

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer: Subject to compliance with the Contract Documents, products of the manufacturer's listed below will be acceptable.
 1. Viracon
 2. Insulite Glass Company.
 3. AGC Glass North America, Inc.
 4. Cardinal Glass Industries.
 5. Oldcastle.
 6. Vitro Architectural Glass.
 7. Guardian Industries Corp.
 8. PPG Industries, Inc.
- B. Substitutions: Manufacturer's other than those listed above will not be considered.

2.02 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass. The IBC defines wind-borne debris regions. Enhanced protection applies to essential facilities. Verify requirements of authorities having jurisdiction.
- C. Abbreviations:
 1. AN - Annealed.
 2. HS - Heat Strengthened.
 3. FT - Fully Tempered.
 4. LAM - Laminated.
 5. STC - Sound Transmission Coefficient.
 6. PVB - Polyvinyl Butyral.

2.03 MONOLITHIC GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class 1 (clear) or Class 2 (tinted) as indicated.
- B. Heat-Treated Float Glass:
 1. Heat Strengthened (HS):
 - a. Compliance: ASTM C1048; Type 1; Class 1 (clear) or Class 2 (tinted); Quality q3.
 - 1) Uncoated glass, comply with requirements for Condition A.
 - 2) Coated glass, comply with requirements for Condition C.
 2. Fully Tempered (FT):
 - a. Compliance: ASTM C1048 ; Type 1; Class 1 (clear) or Class 2 (tinted); Quality q3.
 - 1) Uncoated glass, comply with requirements for Condition A.
 - 2) Coated glass, comply with requirements for Condition C.
 - 3) All tempered architectural safety glass shall conform with ANSI Z97.1.

2.04 FIRE AND IMPACT RATED GLAZING

- A. Refer to Section 08 81 17 - Fire-Rated Glass.

2.05 INSULATING GLAZING UNITS

- A. Where indicated in the drawings or required by location.
- B. Insulating Glazing Units - Heat Strengthened Glass:
 - 1. Product: Viracon; Model No. VE(XX)-2M Insulating Coated Glass Unit, or equivalent.
 - a. Overall Unit Thickness: 1-inch (25mm) unless indicated otherwise.
 - b. Color: Match Existing.
 - 2. Assembly:
 - a. Exterior Glass Ply: 1/4-inch (6mm), Tinted HS.
 - b. Coating: Low-E, #2 Surface.
 - c. Air Space: 1/2-inch (13.2mm) clear air space with clear anodized spacer.
 - d. Silicone: Black
 - e. Interior Glass Ply: 1/4-inch (6mm) Clear AN
 - 3. Performance Requirements
 - a. Visible Light Transmittance: 46%
 - b. Exterior (Vis-Out) Reflectance: 7%
 - c. Winter U-Value: 0.3
 - d. Summer U-Value: 0.26
 - e. Shading Coefficient: 0.34
 - f. Solar Heat Gain Coefficient: 0.3
 - g. Light to Solar Gain Ratio: 1.53
- C. Insulating Glazing Units - Tempered Glass:
 - 1. Product: Viracon; Model No. VE(XX)-2M Insulating Coated Glass Unit, or equivalent.
 - a. Overall Unit Thickness: 1-inch (25mm) unless indicated otherwise.
 - b. Color: Match Existing.
 - 2. Assembly:
 - a. Exterior Glass Ply: 1/4-inch (6mm) Tinted, FT.
 - b. Coating: Low-E #2 Surface
 - c. Air Space: 1/2-inch (13.2mm) clear air space with clear anodized spacer.
 - d. Silicone: Black.
 - e. Interior Glass Ply: 1/4-inch (6mm) Clear, FT.

2.06 COATED GLASS PRODUCTS

- A. Low-Emissivity (Low-E) Coated Glass:
 - 1. Sputter-Coated Low-Emissivity (Low-E) Vision Glass:
 - a. Compliance: ASTM C 1376, coated by sputtered process, ASTM C 1036, Type I, Quality-Q3, Class 1 (Clear) or Class 2 (Tinted), and complying with other requirements specified.
 - b. Product: AGC; Energy Select 40, High-Performance; Triple-silver on clear substrate.
 - 1) Coating Position: Surface 2 unless indicated otherwise.
 - 2) Color: Neutral aesthetic, with a slightly bluer hue, 62% VLT and 0.28 SHGC.
- B. Ceramic-Coated Glass:
 - 1. Ceramic-Coated Spandrel Glass:
 - a. Compliance: ASTM C1048 Standard Specification for Heat-Treated Float Glass - Kind HS, Kind FT Coated and Uncoated, Condition B; ASTM C 1036 Type I, Quality q3.

2.07 TEMPERED TINTED SINGLE GLASS

- A. For exterior aluminum entrances, provide 1/4-inch Tinted, FT or equivalent.

2.08 LAMINATED (SECURITY) GLASS

- A. Compliance: ASTM C 1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven

record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

- B. Construction: Laminate two (2) layers of glass with polyvinyl butyral (PVB) interlayer to comply with interlayer manufacturer's written recommendations.
 - 1. Glass Thickness: 1/8-inch.
 - 2. Polyvinyl Butyral (PVB) Interlayer:
 - a. Product:
 - 1) Viracon; "Vanceva® Color Interlay System".
 - b. Thickness: 0.060 inch (1.524 mm).
 - 1) Provide thickness not less than that indicated and as needed to comply with requirements.
 - c. Interlayer Color:
 - 1) Clear, unless otherwise indicated.
 - 3. Overall Thickness: 5/16-inch.

2.09 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
 - 1. Neoprene complying with ASTM C 864.
 - 2. EPDM complying with ASTM C 864.
 - 3. Silicone complying with ASTM C 1115.
 - 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.10 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 4. Colors of Exposed Glazing Sealants: Clear.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 795.
 - b. GE Advanced Materials - Silicones; SilPruf SCS2000.
 - c. Sika Corporation, Construction Products Division; SikaSil-C995.
 - d. Tremco Incorporated; Spectrem 2.
 - 1) Applications: All Glass interior walls.

2.11 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 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.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.12 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.13 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

2.14 GLASS TYPES

- A. Glass Type FL: Heat-strengthened (HS) float glass.
 - 1. Thickness: 1/4-inch.
 - 2. Color: Clear .
 - 3. Provide safety glazing labeling.
- B. Glass Type T (Safety Glass): Fully tempered (FT) safety glass.
 - 1. Thickness: 1/4-inch.
 - 2. Color: Clear .
 - 3. Provide safety glazing labeling.
- C. Glass Type LAM (Security Glass): Laminated (LAM) security glass.

1. Thickness: 5/16-inch (1/8-inch AN + 0.060-inch PVB + 1/8-inch AN).
 2. Provide safety glazing labeling.
- D. Glass Type GL-I: Low-E coated, tinted insulating glass.
1. Overall Unit Thickness: 1 inch (25 mm).
 2. Thickness of Each Glass Lite: 1/4-inch.
 3. Outdoor Lite: Tinted, HS or FT glass, as required by location.
 - a. Color: Match Existing.
 4. Interspace Content: Air.
 5. Indoor Lite: Clear, HS or FT glass, as required by location.
 6. Low-E Coating: #2 surface
 7. Provide safety glazing labeling.
- E. Glass Type GL-SP: Ceramic-coated, tinted, insulating spandrel glass.
1. Overall Unit Thickness: 1 inch (25 mm).
 2. Thickness of Each Glass Lite: 1/4-inch.
 3. Outdoor Lite: Tinted, FT glass.
 - a. Color: Match Existing.
 4. Interspace Content: Air.
 5. Indoor Lite: Clear, HS or FT, as required by location.
 6. Ceramic Coating Location: Fourth surface.
- F. Glass Type GL-FIR: Fire-protection-rated glass.
1. Refer to Section 08 81 17 for requirements.
 2. Refer to drawings for fire labeling.
- G. Glass Type GL-FIR: Fire-resistant-rated glass.
1. Refer to Section 08 81 17 for requirements.
 2. Refer to drawings for fire labeling.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep systems.
 3. Minimum required face and edge clearances.
 4. Effective sealing between joints of glass-framing members.
 5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

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

3.03 GLAZING INSTALLATION, 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. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge

damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
 - 3. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
 - 4. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
 - 5. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
 - 6. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
 - 7. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

H. TAPE GLAZING

- 1. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- 2. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- 3. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- 4. 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.
- 5. Do not remove release paper from tape until right before each glazing unit is installed.
- 6. Apply heel bead of elastomeric sealant.
- 7. 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.
- 8. Apply cap bead of elastomeric sealant over exposed edge of tape.

I. GASKET GLAZING (DRY)

- 1. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- 2. 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.
- 3. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to

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

4. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
5. Install gaskets so they protrude past face of glazing stops.

J. SEALANT GLAZING (WET)

1. 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.
2. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
3. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

K. CLEANING AND PROTECTION

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

END OF SECTION

SECTION 08 81 17
FIRE-RATED GLASS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Fire-protection-rated glazing.
- B. Fire-resistance-rated glazing.

1.03 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 081416 - Flush Wood Veneer Doors
- C. Section 084123 - Fire-Rated Aluminum Framed Entrances and Storefronts
- D. Section 084125 - Fire-Rated Steel Entrances and Framing Systems
- E. Section 088000 - Glazing
- F. Section 092116 - Demonstration and Training

1.04 REFERENCES

- A. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- C. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- D. GANA - Glazing Manual.
- E. FGMA - Sealant Manual.
- F. NFPA 80: Fire Doors and Windows.
- G. UL 263: Fire tests of Building Construction and Materials

1.05 DEFINITIONS

- A. Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period exceeding 45-minutes.
- B. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.

1.06 PERFORMANCE REQUIREMENTS

- A. Fire-rated, clear and wireless glazing material for use in locations such as doors, sidelites, transoms, borrowed lites, and wall applications with fire rating requirements ranging from 45-minutes to 3-hours with required hose stream test; for use in interior or exterior applications.
- B. Provides protection by reducing the radiant and conductive heat transfer.

1.07 SUBMITTALS

- A. Comply with requirements of Section 013300 - Submittal Procedures
- B. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.
- C. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a

recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

- D. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- E. Samples: Submit, for verification purposes, approx. 8-inch by 10-inch sample for each type of glass indicated.

1.08 QUALITY ASSURANCE

- A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.
- B. Fire Resistance Rated Glass: Each lite shall bear permanent, nonremovable label of UL certifying it for use in tested and rated fire resistive assemblies.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to specified destination in manufacturer or distributor's packaging, undamaged, complete with installation instructions.
- B. Store off ground, under cover, protected from weather and construction activities.
- C. Do not expose the non-PVB side of glass to UV light.
- D. Store sheets of glass vertically. DO NOT lean.

1.10 WARRANTY

- A. The manufacturer shall warrant the product against material defects, or defects in manufacturing, for ten (10) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Technical Glass Products (TGP).
 - 1. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Fire-Resistance-Rated Glass:
 - 1) SAFTIFIRST.
 - 2) Vetrotech North America.
 - b. Fire-Protection-Rated Glass:
 - 1) SAFTIFIRST.
 - 2) SCHOTT North America.
 - 3) Vetrotech North America.

2.02 GLASS PRODUCTS, GENERAL

- A. Safety Glazing Labeling: Permanently mark glazing with certification label of 16 CFR 1201 Category I and Category II, ANSI Z97.1 and CAN/CGSB-12.1-M. Label shall indicate manufacturer's name, type of glass, and safety glazing standard with which glass complies.

2.03 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
 - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.04 FIRE-RESISTANCE-RATED GLAZING MATERIALS (GLAZING TYPE GL-7)

- A. Fire-Resistance-Rated Glazing, scheduled on the Drawings as Glazing Type 'GL-7'.
- B. Basis of Design Product: TGP; "Pilkington Pyrostop®" Fire-Resistance-Rated Glazing.
 - 1. Glass Type: Tempered Glass with Intumescent Interlayers:
 - a. Construction: Composed of multiple plies of Pilkington Optiwhite™ tempered, high visible light transmission glass laminated with intumescent interlayers, and complying with 16 CFR 1201 Category II and ANSI Z97.1..
 - 2. Fire-Resistive Rating: 45-, 60-, or 90-minutes.
 - 3. Applications:
 - a. Fire-Rated Wall Assemblies: Assemblies complying with ASTM E119 that are classified and labeled by UL, for fire ratings indicated, based on testing in accordance with UL 263, ASTM E119.
 - 1) Fire Rating Duration: 120-minutes.
 - b. Fire-Rated Doors:
 - 1) Fire-Rating Duration: 45-, 60-, or 90-minutes.
 - 4. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201(Cat. I and II).
 - 5. STC Rating: Up to 46 dB.
 - 6. Interior Glazing - Properties:

Fire-Rating	45 minute	60 minute	60 minute	120 minute
Manu.	45-200	60-101	60-201	120-106
Designation				
Glazing Type	single	single	single	IGU
Nom. Thickness	3/4-inch	7/8-inch	1-1/16 inches	2-1/4 inches
Weight (lbs/sf)	9.2	10.85	12.5	22.9
Daylight	86%	87%	86%	75%
Transmission				
Sound	40dB	41dB	44dB	46dB
Transmission				
Coefficient				

- 7. Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.
- 8. Glazing Accessories: Manufacturer's standard compression gaskets, standoff, spacers, setting blocks and other accessories necessary for a complete installation.
- C. Basis of Design Product: "Pilkington Pyroclear®" Fire-Resistant Glass.
 - 1. Composition:
 - a. Configurations are available with a translucent interlayer for added obscurity and privacy.
 - 2. Thickness:
 - a. Interior Use, Monolithic: 6 mm, 8 mm, or 10 mm.
 - b. Interior Use, Laminated: 13 mm.
 - 3. Fire-Rating Period: 30- or 60-minutes.
 - 4. Performance and Testing:
 - a. Approximate Visible Transmission: Varies with thickness (approximate range 88 to 75 percent).
 - b. Impact Safety Resistance: ANSI Z97.1 and CPSC 16 CFR 1201 (Cat. I and II).
 - c. STC Rating:
 - d. Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E119 and UL 263.
 - 5. Permanently label each piece of fire-resistance-rated glass with the appropriate marking.

2.05 FIRE-PROTECTION-RATED GLAZING MATERIALS (GLAZING TYPE GL-6)

- A. Fire-Protection-Rated Glazing, scheduled on the Drawings as Glazing Type 'GL-6'.
- B. Properties:
 - 1. Description: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.
 - 2. Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 252/NFPA 257 or UL 9/10B/10C, CAN/ULC-S104 and S106, including the hose-stream test, and shall comply with NFPA 80.
 - a. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.
 - b. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.
- C. Types:
 - 1. Fire-Protection-Rated Tempered Glass: 6-mm thickness, fire-protection-rated tempered glass; and complying with 16 CFR 1201, Category II.
 - 2. Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 5-mm thickness; faced on one surface with a clear glazing film; and complying with 16 CFR 1201, Category II.
 - 3. Laminated Ceramic Glazing: Laminated glass made from two plies of clear, ceramic glass; 8-mm total thickness; and complying with 16 CFR 1201, Category II.
 - 4. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, float glass; with intumescent interlayers; and complying with 16 CFR 1201 Category II and ANSI Z97.1.
 - 5. Tempered Glass with Intumescent Interlayers: Tempered glass made from multiple plies of uncoated float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
- D. Basis of Design Product: "FireLite®" as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products,
 - 1. Applications:
 - a. Glazing in fire-rated door assembly.
 - 2. Performance:
 - a. Fire-protection-rated glass ceramic clear and wireless glazing material listed for use in non-impact safety-rated locations such as transoms and borrowed lites with fire rating requirements ranging from 20 to 90 minutes with required hose stream test.
 - b. Passes positive pressure test standards UL 10C.
 - 3. Properties:
 - a. Thickness: 3/16-inch [5 mm].
 - b. Weight: 2.56 lbs/ft² (12.5 kg/m²).
 - c. Approximate Visible Transmission: 88 percent.
 - d. Approximate Visible Reflection: 9 percent.
 - e. Hardness (Vicker's Scale): 700.
 - f. Fire-rating Period: 20-, 60-, and 90-minutes, other than doors.
 - g. Impact Safety Resistance: None.
 - h. Positive Pressure Test: UL 10C UL 10C; passes.
 - i. Surface Finish:
 - 1) Standard Grade is polished for a surface quality that is comparable to alternative fire-rated ceramics marketed as having a premium finish.
 - 2) Premium Grade is finish ground and polished on both surfaces to provide superior surface quality, improving overall clarity and providing a surface that is unmatched by alternative products.

- 3) Obscure-Patterned surface for privacy
 4. Labeling: Permanently label each piece of fire-rated glass with the manufacturer's logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the product label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).
 5. Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2010-01, NFPA 257, UL 9 and UL 10B.
- E. Manufacturer: FireLite NT® as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products,
1. Applications:
 2. Performance:
 - a. Fire-rated glass ceramic clear and wireless glazing material listed for use in non-impact safety-rated locations such as transoms and borrowed lites with fire rating requirements ranging from 20-minutes to 3-hours with required hose stream test.
 - b. Passes positive pressure test standards UL 10C.
 3. Properties:
 - a. Thickness: 3/16 inch (5 mm).
 - b. Film: Fire-rated surface film as approved by manufacturer.
 - c. Weight: 2.56 lbs/ft² (12.5 kg/m²).
 - d. Approximate Visible Transmission: 88-percent.
 - e. Approximate Visible Reflection: 9-percent.
 - f. Hardness (Vicker's Scale): 700.
 - g. Fire-rating:
 - 1) Doors: 20-, 45-, 60-, and 90-minutes, and 3 hours.
 - 2) Other Applications: 20-, 45-, 60-, and 90-minutes.
 - h. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - i. Positive Pressure Test: UL 10C; passes.
 - j. Surface Finish:
 - 1) Standard Grade is polished for a surface quality that is comparable to alternative fire-rated ceramics marketed as having a premium finish.
 - 2) Premium Grade is finish ground and polished on both surfaces to provide superior surface quality, improving overall clarity and providing a surface that is unmatched by alternative products.
 - 3) Obscure-Patterned surface for privacy.
 4. Labeling: Permanently label each piece of fire-rated glass with the manufacturer's logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the product label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).
 5. Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2010-01, NPFA 252, NFPA 257, UL 9, UL 10B and UL 10C.
- F. Basis of Design Product: "FireLite Plus®" as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products,
1. Glass Type: Safety ceramic glass.
 2. Performance:
 - a. Fire-rated glass ceramic clear and wireless glazing material listed for use in non-impact safety-rated locations such as transoms and borrowed lites with fire rating requirements ranging from 20 to 90 minutes with required hose stream test.
 - b. Passes positive pressure test standards UL 10C
 3. Applications:
 - a. Glazing in fire-rated door assemblies.
 4. Properties:
 - a. Thickness: 5/16 inch [8 mm] overall.
 - b. Weight: 4 lbs./sq. ft.
 - c. Approximate Visible Transmission: 85 percent.

- d. Approximate Visible Reflection: 9 percent.
 - e. Fire-Rating:
 - 1) Doors: 20-, 45-, 60-, and 90-minutes, and 3-hours.
 - 2) Other Applications: 20-, 45-, 60-, and 90-minutes.
 - f. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - g. STC Rating: Approximately 38 dB.
 - h. Positive Pressure Test: UL 10C; passes.
 - i. Surface Finish:
 - 1) Standard Grade is polished for a surface quality that is comparable to alternative fire-rated ceramics marketed as having a premium finish.
 - 2) Premium Grade is finish ground and polished on both surfaces to provide superior surface quality, improving overall clarity and providing a surface that is unmatched by alternative products.
5. Maximum sheet sizes based on surface finish:
- a. Premium: 48 inches by 96 inches.
 - b. Standard: 48 inches by 96 inches.
6. Labeling: Permanently label each piece of fire-rated glass with the manufacturer's logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the product label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).
7. Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2010-01, NFPA 252, NFPA 257, UL 9, UL 10B and UL 10C.

2.06 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 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.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.07 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.08 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Observable edge damage or face imperfections.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.02 INSTALLATION (GLAZING)

- A. Comply with referenced GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.
- B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
- D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- E. Place setting blocks located at quarter points of glass with edge block no more than 6-inches from corners.
- F. Glaze vertically into labeled fire-rated metal frames or partition walls with the same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- G. Place glazing tape on free perimeter of glazing in same manner described above.
- H. Install removable stop and secure without displacement of tape.
- I. Do not remove protective edge tape.
- J. Install removable stop and secure without displacement of tape.
- K. Do not pressure glaze.
- L. Glaze exterior openings with PVB layer toward the exterior of the building.
- M. Knife trim protruding tape.
- N. Apply cap bead of silicone sealant along void between the stop and the glazing, to uniform line, with bevel to form watershed away from glass. Tool or wipe sealant surface smooth.
- O. Provide minimum 3/16-inch edge clearance.
- P. Install in vision panels in fire-rated doors to requirements of NFPA 80.
- Q. Install so that appropriate UL and Pilkington Pyrostop® markings remain permanently visible.
- R. Install so that appropriate [UL] [FireLite Plus®] markings remain permanently visible.

3.03 PROTECTION AND CLEANING

- A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.
- B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Interior gypsum board.
- B. Joint treatment and accessories.

1.03 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.
- B. Section 07 21 00 - Thermal Insulation.
Section 07 84 00 - Penetration Firestopping.
- C. Section 07 92 00 - Joint Sealants.
- D. Section 09 22 16 - Non-Structural Metal Framing.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Pre-decorated Samples: Submit two samples of gypsum board finished with proposed finish application, 12 by 12 inches in size, illustrating finish color and texture.
- C. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.05 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least one patient room in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet, or moisture damaged, include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gypsum Board:
 1. Specified Manufacturer: USG Corporation.
 2. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. CertainTeed Corp.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. Temple-Inland.
- B. Specialty Gypsum Board: Refer to "Specialty Gypsum Board" Article this Section.
- C. Other Materials: As specified in this Section.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.03 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.
- B. Owner Standards:
 1. **All interior gypsum board provided shall be moisture and mold resistant, unless otherwise indicated.**
 2. **All interior gypsum board provided shall be Type X where required for fire-resistance-rated assembly, and on all vertical surfaces unless otherwise indicated.**

2.04 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 1. Product: USG; Sheetrock® Brand EcoSmart Panels Firecode® X.
 2. Thickness: 3/4 inch.
 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 1. Product: USG; Sheetrock® Brand EcoSmart Panels Firecode® X.
 2. Thickness: 5/8 inch (15.9 mm).
 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 1. Product: USG; Sheetrock® Brand Gypsum Panels.
 2. Thickness: 1/2 inch (12.7 mm).
 3. Long Edges: Tapered.
- D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M; with moisture- and mold-resistant core and paper surfaces.
 1. Product: USG; Sheetrock® Brand EcoSmart Panels, Mold Tough® Firecode® X Panels.
 2. Thickness: 5/8 inch (15.9 mm).
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10.

2.05 SPECIALTY GYPSUM BOARD

- A. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multi-layer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.
 - 1. Products: Subject to compliance with the Contract Documents, products of the manufacturer's listed below will be acceptable.
 - a. Supress Products, Supress.
 - b. Quiet Solution, Quiet Rock 525.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Long Edges: Tapered.

2.06 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Manufacturer / Products: USG Sheetrock® Brand or equivalent.
 - 2. Material: Galvanized or rolled zinc.
 - 3. 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.

2.07 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- 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 setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
 - a. Product: "Hamilton Prep Coat - Level 5 Drywall Completion System", as manufactured by Hamilton Drywall Products.

2.08 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- D. Sound Attenuation Blankets (Batts): Refer to Section 07 21 00.

- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AIS-919.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. Tremco; Acoustical Sealant.
 - f. USG Corporation; SHEETROCK Acoustical Sealant.
 - 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Thermal Insulation: Refer to Section 07 21 00.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with

manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: As indicated on Drawings.
 - 2. Type X: Where required for fire-resistance-rated assembly, and all vertical surfaces unless otherwise indicated.
 - 3. Ceiling Type: Ceiling surfaces.
 - 4. Moisture- and Mold-Resistant Type X: As indicated on Drawings, at all interior surfaces of exterior walls, interiors of toilet rooms and showers and wet walls.
 - 5. Acoustically Enhanced Type: As indicated on Drawings.
 - 6. Skim-Coated Type: All walls scheduled for Gloss finish painting.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 2. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.04 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings, according to ASTM C 840 and in specific locations approved by Architect for visual effect. They shall be installed in face layer of gypsum where there are continuous walls or ceilings of 30'-0" or greater, at 30'-0" o.c. max., and at each side of all doors, windows, borrowed lights and cased openings 44" or wider, on both sides of wall, each side of these at frame jambs from head to above ceiling, and/or from bottom of borrow light to floor. Align ceiling and soffit gypsum joints with wall gypsum joints where possible.
- C. Interior Trim: Install with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions. All exposed edges of gypsum shall have trim. Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. LC-Bead: Use where indicated.

3. L-Bead: Use where indicated.
4. U-Bead: Use where indicated.

3.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile, and behind cabinetry.
 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 4. Level 5: Walls and ceilings scheduled to receive gloss paint finish including areas to receive epoxy paint as scheduled.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.06 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

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

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Provide sealed engineering calculations and designs as may be required for special framing conditions based on deflection limitations of L/240, 5 lbs/sq. ft. live load and dead load per location for painted finishes. Facebrick, stone and tile finishes shall have L/640 deflection limitations.

1.04 INFORMATION SUBMITTALS

- A. Evaluation Reports: For dimpled steel studs, Pro steel studs and runners, and firestop tracks, from ICC-ES.

PART 2 PRODUCTS

2.01 DESCRIPTION

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

2.02 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 metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40 (Z180), hot-dip galvanized, unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or Pro steel studs and runners.
 - 1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: As indicated on Drawings 0.033 inch (0.84 mm).
 - b. Depth: As indicated on Drawings, 3-5/8 inches (92 mm), 6 inches (152 mm), 2-1/2 inches (64 mm), 1-5/8 inches (41 mm).
 - c. Typical studs scheduled for full height installation to bottom of concrete fins above (14'-7") shall be 3-5/8" Pro 25, for listed gypsum products or Pro 2 series for generic gypsum boards, by Dietrich or equal.
 - d. Typical studs scheduled for full height installation to bottom of concrete fins above (15'-6") shall be 3-5/8" Pro 22, for listed gypsum products or Pro 20 DW series for generic gypsum, by Dietrich or equal.
 - e. Typical studs scheduled for full height installation to concrete above as 6" shall be 6" Pro 25 ga. by Dietrich or equal.
 - f. Typical studs scheduled for thru ceiling furr-out, (10'-6") shall be 2-1/2" Pro 20 DW series with mechanical bridging at 4'-0" o.c. max., by Dietrich or equal.

2. Partial Height Wall Framing: Where indicated on the drawings, provide MidWall partial wall framing system as manufactured by The Steel Network. Provide sizes, clips and details for a complete installation.
3. Slip-Type Head Joints: Where indicated, provide one of the following, allowing for 1" of movement:
 - a. Single Long-Leg Slotted Runner System: ASTM C 645 top runner with 2-1/2-inch deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
4. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - a. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
5. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - a. Depth: 1-1/2 inches (38 mm).
 - b. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
6. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 - b. Depth: 7/8 inch (22.2 mm).

2.03 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: Post-installed, expansion anchor.
 - b. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
 1. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - a. Depth: 1-1/2 inches (38 mm).
 2. Furring Channels (Furring Members):
 - a. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - b. Steel Studs and Runners: ASTM C 645.
 - 1) Minimum Base-Metal Thickness: As indicated on Drawings or determined by span and loading requirements.
 - 2) Depth: As indicated on Drawings, 3-5/8 inches (92 mm) typical and others as needed by spans and loadings.
 - 3) Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - (a) Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 3. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Armstrong World Industries, Inc.; Drywall Grid Systems.
 - 2) Chicago Metallic Corporation; Drywall Grid System.
 - 3) USG Corporation; Drywall Suspension System.

2.04 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
 - 2. Isolation Strip at Exterior Walls: Provide one of the following:
 - a. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
 - b. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
 - 2. Coordination with Sprayed Fire-Resistive Materials:
 - a. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
 - b. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.03 INSTALLATION, GENERAL

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

3.04 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install studs so flanges within framing system point in same direction.
 - 1. Space studs as follows:

- a. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
- b. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
- c. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - a. 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.
 - b. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1) Install two 20 ga. studs at each jamb unless otherwise indicated.
 - 2) Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - 3) Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 4) 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.
 - 5) 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.
 - 6) Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 7) 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 (150 mm) o.c.
3. Direct Furring:
 - a. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
4. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.05 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
 - 1) 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, minimum of 5 pounds per square foot uniform live load plus dead loads with L/360 deflection limit.

- 2) 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.
 - 3) 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.
 - 4) Do not connect or suspend steel framing from ducts, pipes, or conduit.
2. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
 3. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
 4. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
 5. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for base installations.
- C. Tile for wall applications.

1.03 RELATED REQUIREMENTS

- A. Section 01 45 00 - Concrete In-Situ Relative Humidity and pH Testing
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 07 92 00 - Joint Sealants
- D. Section 09 21 16 - Gypsum Board Assemblies
- E. Section 09 30 50 - Metal Edge Protection and Transition Profiles
- F. Division 22 - Plumbing

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Metal edge strips in 6-inch (150-mm) lengths.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, signed by product manufacturer.
- D. Material Test Reports: For each tile-setting and -grouting product.

1.06 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 in unopened cartons, equal to not less than 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.07 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 1. Joint sealants.
 2. Metal edge strips.
- D. 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 wall tile installation.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site.
 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.09 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: As specified for each tile type .
 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 1. Provide tile complying with Standard grade requirements unless otherwise 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 TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.
1. Products: Refer to Interior Finish Schedule and Materials/Color Group Schedule.

2.03 TILE PRODUCTS - GENERAL

- A. Owner Standard: The tiling products specified in this Section are restricted to the specified manufacturers and products unless indicated otherwise.

2.04 TILE PRODUCTS - FLOORING APPLICATIONS

- A. Porcelain Tile: Designated on the Interior Finish Legend in the Drawings as Finish Type PT- #.
1. Type PT-1:
 - a. Manufacturer: Ergon
 - b. Style: Cornerstone
 - c. Color: Granite Stone - Naturale Finish
 - d. Size: 12" x 24"
 - e. Grout Type: GR-2; GR-1 in wet areas
 - f. Installation Method: 1/3 Offset
 2. Type PT-2:
 - a. Manufacturer: ISC / American Olean
 - b. Style: _____
 - c. Color: Scene Shore
 - d. Size: 12" x 24"
 - e. Grout Type: GR-2; GR-1 in wet areas
 - f. Installation Method: 1/3 Offset
 3. Type PT-3:
 - a. Manufacturer: Nova Bell
 - b. Style: Milano 4
 - c. Color: Certosa Chocolate
 - d. Size: 12" x 24"
 - e. Grout Type: GR-2; GR-1 in wet areas
 - f. Installation Method: 1/3 Offset
- B. Quarry Tile: Designated on the Interior Finish Legend in the Drawings as Finish Type QT- #.
1. Type QT-1:
 - a. Manufacturer: ISC / American Olean
 - b. Style: Quarry Naturals
 - c. Color: Shadow Gray
 - d. Size: 8" x 8"
 - e. Grout Type: GR-1
 - f. Installation Method: Grid Pattern

2.05 TILE PRODUCTS - BASE APPLICATIONS

- A. Porcelain Tile Base: Designated on the Interior Finish Legend in the Drawings as Finish Type PTB- #.
1. Type PTB-1:
 - a. Material: Same as PT-1; Cove base
 - b. Size: 6" x 12"
 2. Type PTB-2:
 - a. Material: Same as PT-2
 - b. Size: 6" x 12"

- c. Grout Type: GR-1
 - d. Installation: Use TEP-2 cove trim piece
- 3. Type PTB-3: Not Used.
- 4. Type PTB-4:
 - a. Material: Same as PT-3
 - b. Size: 6" x 12"
 - c. Grout Type: GR-1
 - d. Installation: Use TEP-2 cove trim piece

2.06 TILE PRODUCTS - WALL APPLICATIONS

- A. Wall Tile: Designated on the Interior Finish Legend in the Drawings as Finish Type WT- #.
 - 1. Type WT-1:
 - a. Manufacturer: ISC / American Olean
 - b. Material: Porcelain
 - c. Style: Scene
 - d. Color: SC02 - Shore
 - e. Size: 12" x 24"
 - f. Thickness: 3/8 inch
 - g. Surface: _____
 - h. DCOF Value (Wet): Equal to or greater than 0.42
 - i. Grout Type: GR-1
 - j. Tile Joint Width: 1/8-inch
 - 2. Type WT-2:
 - a. Manufacturer: Lunada Baytile
 - b. Material: Glass Mosaic Tile
 - c. Style: Agate Martini
 - 1) Pattern / Size: Martini - 5/8" x 2"
 - d. Color: Pisa Pearl
 - e. Grout Type: GR-2
 - 3. Type WT-3:
 - a. Manufacturer: Lunada Baytile
 - b. Material: Glass Mosaic Tile
 - c. Style: Agate
 - d. Pattern / Size:
 - 1) Herringbone - 1/2" by 1"
 - 2) Mini Brick - 1/2" x 1"
 - e. Color: Verona Pearl
 - f. Grout Type: GR-2
 - 4. Type WT-4:
 - a. Manufacturer: Lunada Baytile
 - b. Material: Glass Mosaic Tile
 - c. Style: Tozen
 - d. Pattern / Size:
 - 1) Herringbone - 1" x 4"
 - 2) Mini Brick - 1/2" x 1"
 - e. Color: Ahou Natural
 - f. Grout Type: GR-2

2.07 SETTING MATERIAL

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

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. Bostik, Inc.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 - d. Summitville Tiles, Inc.
 - e. TEC; a subsidiary of H. B. Fuller Company.
2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin liquid-latex additive at Project site.
4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
5. For all glass tile provide white materials.

2.08 GROUT

- A. Grout: Designated on the Interior Finish Legend in the Drawings as Finish Type GR- #.
 1. Type GR-1:
 - a. Manufacturer: Mapei
 - b. Product: Ultracolor Plus
 - 1) Polymer-Modified Tile Grout
 - c. Color: #11 - Sahara Beige
 - d. Width of Grout Lines: 1/8-inch
 2. Type GR-2:
 - a. Manufacturer: Mapei
 - b. Product: Keracolor S
 - 1) Water-Cleanable Epoxy Grout
 - c. Color: #11 - Sahara Beige
 - d. Width of Grout Lines: 1/8-inch
- B. Grout Materials:
 1. Polymer-Modified Tile Grout (GR-1): ANSI A118.7.
 - a. Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 2. Water-Cleanable Epoxy Grout (GR-2): ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D.
 - a. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and certified by manufacturer for intended use.

2.09 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 07 92 00 - Joint Sealants.
- B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920 , Type S, Grade NS, Class 25, for Use NT.
 1. Products:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - d. Tremco Incorporated; Tremsil 200 Sanitary.
- C. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

2.10 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 Protection: Refer to Section 09 30 50.
- C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bostik, Inc.; Siloxane 220.
 - b. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
 - c. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - d. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

2.11 MIXING MORTARS AND GROUT

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

PART 3 EXECUTION

3.01 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 installed tile.
 - 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 installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. 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.
- B. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.03 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA 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 TCA 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. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - b. Tile floors composed 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. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. 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.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Metal Edge Strips: Install at locations indicated.
- I. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.04 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION

SECTION 09 30 50

METAL EDGE PROTECTION AND TRANSITION PROFILES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Edge-protection and transition profiles for floors and walls.

1.03 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 09 30 00 - Tiling
- C. Section 09 65 00 - Resilient Flooring
- D. Section 09 68 13 - Resilient Base and Accessories

1.04 DEFINITIONS

- A. Metal Edge Protection and Transition Profiles from here on shall be referred to as "Edge Protection".

1.05 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and finish.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five-years experience.
- B. Source Limitations for Setting Materials and Accessories: Obtain product of a uniform quality for each application condition from a single manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.08 PROJECT CONDITIONS

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

1.09 COORDINATION

- A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed materials.

1.10 WARRANTY

- A. Floor and Wall Profiles - Limited Warranty: The manufacturer shall warrant the product against material defects, or defects in manufacturing, for five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Schluter Systems.

1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 APPLICATIONS

- A. Applications for Metal Edge Protection:
 1. Open edges of wall tile.
 2. Open edges of floor tile.
 3. Wall corners, outside and/or inside.
 4. Transition between floor finishes of different heights.

2.03 EDGE PROTECTION PRODUCTS - WALLS

- A. Edge Protection for Walls: Designated on the Interior Finish Legend in the Drawings as Finish Type TEP- #.
- B. Type TEP-1: Schluter-QUADEC
 1. Description: Profile with square visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 2. Corners:
 - a. Provide with matching inside corners.
 - b. Provide with matching outside corners.
 - c. Provide with internal connectors.
 3. Material and Finish:
 - a. E - Stainless Steel Type 304 = V2A.
 - 1) Height as required to coordinate with tile selection and setting system selected.

2.04 MOVEMENT JOINTS AND COVE-SHAPED PROFILES

- A. Movement Joints and Coved-Shaped Profiles: Designated on the Interior Finish Legend in the Drawings as Finish Type TEP- #.
- B. Type TEP-2: Schluter-DILEX-AHK
 1. Description: Profile with integrated trapezoid-perforated anchoring legs, connected at a 90-degree angle by a cove shaped section with 3/8 inch (10 mm) radius that forms the visible surface.
 2. Corners:
 - a. Provide with matching inside corners.
 - b. Provide with matching outside corners.
 - c. Provide with matching end caps.
 - d. Provide with matching connectors.
 3. Material and Finish:
 - a. AE - Satin Anodized Aluminum.
 - 1) Height as required to coordinate with tile selection and setting system selected.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 PROTECTION

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

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Suspended exposed tee metal grid ceiling system.
- B. Acoustical units:
 - 1. Acoustical panels.

1.03 RELATED REQUIREMENTS

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. Section 09 54 26 - Wood Panel Ceilings
- C. Division 21 - Fire Protection
- D. Division 23 - HVAC
- E. Division 26 - Electrical

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6-inches- (150-mm-) in size.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.

1.06 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Revise subparagraphs below to suit Project.
 - 2. Ceiling suspension-system members.
 - 3. Method of attaching hangers to building structure.
 - a. Retain first subparagraph below if cast-in-place attachment devices are required for Project.
 - b. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 4. Size and location of initial access modules for acoustical tile.
 - 5. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 6. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).
- B. Qualification Data: For testing agency.

- C. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.
- E. Field quality-control reports.

1.07 CLOSEOUT SUBMITTALS

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

1.08 MAINTENANCE MATERIAL SUBMITTALS

- A. Deliver extra acoustical units for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
 - 1. Ceiling Panels: For each type specified, provide full-size panels in unopened boxes equal to no less than 5 percent of quantity installed.

1.09 QUALITY ASSURANCE

- A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.12 WARRANTY

- A. Warranty: ClimaPlus™ 30 year limited system warranty. Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustical Panels:
 - 1. Specified Manufacturer: USG Interiors, Inc.
 - a. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.
- B. Suspension Systems:
 - 1. Specified Manufacturer: USG Interiors, Inc.
 - a. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to the 2018 IBC, Section 1613 or ASCE 7.
 - 1. Seismic Risk Category: IV
 - 2. Site Classification: C
 - 3. Seismic Design Category (Table 1613.2.5(2)): C
 - 4. Refer to structural drawings for seismic design requirements
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.03 ACOUSTICAL PANELS

- A. Owner Standard: The acoustical ceiling products specified in this Section are restricted to the specified manufacturers and products unless indicated otherwise.
- B. Products: Designated in the Drawings as Finish Type ACT- #.
- C. Type ACT-1:
 - 1. Product: USG; Radar Clima Plus #2210.
 - 2. Material: Mineral Fiber.
 - 3. Size: 24 by 24 inches (600 by 600 mm).
 - 4. Thickness: 5/8 inches (15 mm).
 - 5. Edge: Square.
 - 6. Color: White.
 - 7. Surface Pattern: Perforated, small holes, and light texture.
 - 8. Applications: Public Spaces, Back of House.
 - 9. ASTM E84:
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 50 or less.
 - c. Fire Rating: Class A.
 - 10. Acoustics: 0.55 NRC / 33 CAC.
 - 11. Suspension System: Exposed grid, Type A.
- D. Type ACT-2:
 - 1. Product: USG; Clean Room Clima Plus #56060 Panels.
 - 2. Description: Panels have an embossed, vinyl-laminated face with sealed back and edges for use in Class 10M–100M (ISO 7) clean rooms..
 - 3. Size: 24 by 24 inches (600 by 600 mm).
 - 4. Thickness: 5/8 inches (15 mm).
 - 5. Edge: Square.
 - 6. Color: White.
 - 7. Surface Pattern: Perforated, small holes.
 - 8. Applications: Clean Rooms, Soiled, Procedure, and Laboratory.
 - 9. Fire Rating: Class A.
 - 10. Acoustics: 0.55 NRC / 35 CAC.
 - 11. Suspension System: Exposed grid, Type A.
- E. Type ACT-3:
 - 1. Product: USG; Clean Room Clima Plus #56099 Panels.
 - 2. Description: Panels have an embossed, vinyl-laminated face with sealed back and edges for use in Class 100 (ISO 5) clean rooms..
 - 3. Size: 24 by 24 inches (600 by 600 mm).
 - 4. Thickness: 5/8 inches (15 mm).
 - 5. Edge: Square.
 - 6. Color: White.
 - 7. Surface Pattern: Unperforated.
 - 8. Applications: Operating Rooms, Food Prep.

9. ASTM E84:
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 50 or less.
 - c. Fire Rating: Firecode®.
10. Acoustics: 0.00 NRC / 35 CAC.
11. Suspension System: Exposed grid, Type A.

2.04 SUSPENSION SYSTEM

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- B. Exposed Steel Suspension System Type A: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Product: USG; "DONN® Brand DX/DXL™ 15/16" Acoustical Suspension System", or equivalent.
 2. Profile: Tee; 15/16 inch (24 mm) wide face.
 3. Construction: Double web.
 4. Finish: White painted.
 5. Grid Module: As indicated in drawings.
 6. Fire Rating: Class A.
 7. Seismic Criteria:
 - a. Reference Seismic standards per ASTM E580 and CISC guidelines.
 - b. Seismic Design Category as defined by the 2018 IBC (International Building Code): A-C.

2.05 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Gypsum Board: Fire rated type; 5/8 inch (15 mm) thick, ends and edges square, paper faced.
- D. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
 1. Acoustical Sealant for Concealed Joints:
 - a. Henkel Corporation; OSI Sealants Pro-Series SC-175 Rubber Base Sound Sealant.
 - b. Pecora Corporation; AIS-919.
 - c. Tremco, Inc.; Tremco Acoustical Sealant.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50-percent of acoustical unit size.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.
- L. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch (25 mm) movement. Maintain visual closure.
- M. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.04 INSTALLATION - ACOUSTICAL PANELS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.

- H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
- I. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 54 26
WOOD PANEL CEILINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Wood veneer ceiling panels and suspension system.

1.03 RELATED SECTIONS

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. Section 09 51 00 - Acoustical Ceilings
- C. Division 21 - Fire Suppression
- D. Division 22 - Plumbing
- E. Division 23 - HVAC
- F. Division 26 - Electrical

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed.
- B. Do not install ceiling until after interior wet work is dry.

1.05 SUBMITTALS

- A. Product Data: Provide data on suspension system components and ceiling panels.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C. Verification Samples: For each finish product specified, two samples, minimum size 12 inches (305 mm) square, representing actual product, color, and patterns.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment and periodic cleaning and maintenance of all components.

1.06 QUALITY ASSURANCE

- A. Provide seismic design of suspended ceiling under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.
- B. Fire Performance Characteristics: Suspended wood ceilings shall conform to
 - 1. Fire Performance Characteristics: Suspended wood ceilings shall conform to test standard ASTM E84 and comply with ASTM E1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.
- D. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, wet work i.e. gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store the wood veneer ceiling panels in a dry interior location in their cartons prior to installation to avoid damage. Store the ceiling panel cartons in a flat, horizontal position. Do not remove the protectors between the panels until installation.

- B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Do not expose the wood veneer ceiling panels to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.
- C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

1.08 PROJECT CONDITIONS

- A. Maintain uniform temperature of minimum 40 degrees F (5 degrees C) during and after installation.
- B. Prior to installation, the wood veneer ceiling materials are required to reach room temperature and have stabilized moisture content for a minimum of 72 hours.
- C. Do not install the wood veneer panels in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space.

1.09 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Panels: Furnish quantity of full-size units in unopened cartons, equal to no less than 5-percent of amount installed.

1.10 WARRANTY

- A. Installation Warranty: The Contractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from Date of Substantial Completion.
- B. Manufacturer Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of one (1) year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Armstrong World Industries
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to the 2018 IBC, Section 1613 or ASCE 7.
 - 1. Seismic Risk Category: IV
 - 2. Site Classification: C
 - 3. Seismic Design Category (Table 1613.2.5(2)): C
 - 4. Refer to structural drawings for seismic design requirements
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.03 WOOD VENEER PANEL CEILING

- A. Wood Veneer Ceiling Units: Designated on the Interior Finish Legend in the Drawings as Finish Type WDC- #.
- B. Type WDC-1:
 - 1. Product: Armstrong; Woodworks Linear Veneered Ceiling Panels, Type AP.
 - a. Model: #6691W1
 - b. Surface Texture: Smooth.
 - c. Composition: Fire-retardant particle board with face cut veneers.
 - d. Species/Finish: Natural Variations Walnut.
 - e. Panel Size: 24-inches x 96-inches

- f. Reveal: 1/4-inch
 - g. Profile: 15/16-inch
 - h. Plank Thickness: 3/4-inch
 - i. Sabin: N/A
 - j. Edge Banding and Trim: To match face veneer.
- 2. Performance:
 - a. Noise Reduction Coefficient (NRC) per ASTM C423: 0.20.
 - b. Surface Burning Characteristics (ASTM E84): Flame Spread Index 25 or less. Smoke Developed Index 50 or less.
 - c. ASTM E1264 Classification: Composite - Fire Class A.
 - d. Dimensional Stability: Standard
- 3. Accessories:
 - a. 5823 - BioAcoustic Infill Panel (Black - Matte)
 - b. 6603W1 - WoodWorks Concealed Trim

2.04 SUSPENSION SYSTEM

- A. Product: Prelude XL 15/16" Exposed Tee, as manufactured by Armstrong World Industries
- B. Components:
 - 1. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
 - a. Structural Classification: ASTM C 635 Heavy Duty duty
 - b. Color: Tech Black and match the actual color of the selected ceiling tile, unless noted otherwise.
- C. Attachment Devices:
 - 1. Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- D. Wire for Hangers and Ties:
 - 1. ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three times design load, but not less than 12 gauge.
- E. Wood Works Edge Moldings and Trim:
 - 1. 7800 - 12' Wall Molding

2.05 FABRICATION

- A. Edges, borders, and perimeter trims shall be indicated on the Drawings in accordance with the manufacturer's standard design details. All suspended wood ceiling products specified shall be supplied by the wood slat ceiling manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Work shall not begin until the space is fully enclosed and glazed and all wet work is completed and dried out to the satisfaction manufacturer.
- C. Temperature shall be at least 65 degrees Fahrenheit during the installation and thereafter.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines; approved construction drawings; with the authorities having jurisdiction; and in accordance with the manufacturer's installation instructions.
- B. Install wall moldings at intersection of suspended ceiling and vertical surfaces.
- C. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction, including the following:
 - 1. Install suspension system in accordance with ASTM C636/C636M and ASTM E580/E580M CISCA Seismic Guidelines, and as supplemented in this section.
 - 2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 3. Additional Hanger Wires: Wrapped tightly 3 full turns to structure and component at locations where imposed loads could cause deflection exceeding 1/360 span or tolerances specified below.
- D. Use a laser leveling device to lay out and install the perimeter trim as specified.
- E. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- F. Lay out system to a balanced grid design with edge units no less than 50 percent of wood panel unit size.

3.04 PROTECTION

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

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Static control resilient tile flooring.
- D. Installation accessories.

1.03 RELATED REQUIREMENTS

- A. Section 01 45 00 - Concrete In-Situ Relative Humidity and pH Testing
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 09 30 50 - Metal Edge Protection and Transition Profiles
- D. Section 09 65 13 - Resilient Base and Accessories
- E. Division 26 - Electrical

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
- C. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each different color and pattern of floor covering required.
 - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.
- D. Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch (150-by-230-mm) Sample applied to a rigid backing and prepared by Installer for this Project.
- E. Product Schedule: For floor coverings. Use same designations indicated on Drawings.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Deliver extra resilient flooring material for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
 - 1. Resilient Sheet Floor Covering: Furnish quantity not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.
 - 2. Resilient Tile Floor Covering: For each type specified, provide full-size tiles in unopened cartons equal to no less than 3 percent of each type and color installed.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.
- B. 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.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65 deg F or more than 90 deg F. Store rolls upright.

1.10 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor coverings during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

1.11 WARRANTY

- A. Refer to products specified for warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer: Subject to compliance with the Contract Documents, provide products from the manufacturer's specified in this Section, no exceptions.
 - 1. Substitutions will not be considered for other materials and products that are not specified in this Section.

2.02 RESILIENT FLOORING - GENERAL

- A. Owner Standard: The resilient flooring products specified in this Section are restricted to the manufacturers/products indicated, no exceptions.

2.03 RESILIENT SHEET FLOORING

- A. Resilient Sheet Flooring: Designated on the Interior Finish Legend in the Drawings as Finish Type SV- #.
 - 1. Type SV-1: Homogeneous Sheet Vinyl
 - a. Manufacturer: Armstrong Flooring, Inc
 - b. Product: Medintone Diamond 10 Technology, Homogeneous Sheet Flooring
 - c. Color: #H5311 - Natural White
 - d. Roll Width: 2.0-meters
 - e. Overall Thickness: 0.080 inches (2.0 mm)
 - f. Seaming Method: Heat welded
 - 1) Color: W0288
 - 2) Refer to "Seams" Article this Section.

- g. Integral Flash Cove Base: Type IB-1
 - 1) Refer to "Integral Flash Cove Base" Article this Section.
 - h. Compliance: ASTM F 1913
 - i. Performance:
 - 1) Static Load (ASTM F970): 2000 PSI; Residual Indent: Less than 0.005-inches
 - 2) Fire Test Data:
 - (a) Flame Spread (ASTM E 648): Class I.
 - (b) Smoke Density (ASTM E 662): Less than 450.
 - j. Warranty: 10-Year Limited Commercial Warranty
 - 2. Type SV-2: Heterogeneous Sheet Vinyl
 - a. Manufacturer: Armstrong Flooring, Inc
 - b. Product: Rejuvenations™ Classics, Heterogeneous Sheet Flooring
 - c. Design: Lithos Stone
 - d. Color: #34335 - Phyllite
 - e. Roll Width: 6-feet
 - f. Overall Thickness: 0.080-inches (2.0-mm)
 - g. Seaming Method: Heat welded
 - 1) Color: W0739
 - 2) Refer to "Seams" Article this Section.
 - h. Integral Flash Cove Base: Type IB-1
 - 1) Refer to "Integral Flash Cove Base" Article this Section.
 - i. Compliance: ASTM F1303, Type I, Grade 1, with Class B backing
 - j. Performance:
 - 1) Static Load (ASTM F970): 750 PSI; Residual Indent: Less than 0.005-inches
 - 2) Fire Test Data:
 - (a) Flame Spread (ASTM E 648): Class I.
 - (b) Smoke Density (ASTM E 662): Less than 450.
 - k. Warranty: 5-Year Limited Commercial Warranty
 - 3. Type SV-3: Heterogeneous Sheet Vinyl
 - a. Manufacturer: Parterre
 - b. Product: Remedy Health Floor
 - c. Color: T903 - Natural Walnut
 - d. Roll Width: 6-feet
 - e. Overall Thickness: 2.0-mm
 - f. Seaming Method: Heat welded
 - 1) Color: Natural Walnut
 - 2) Refer to "Seams" Article this Section.
 - g. Integral Flash Cove Base: Type IB-1
 - 1) Refer to "Integral Flash Cove Base" Article this Section.
 - h. Performance:
 - 1) Static Load (ASTM F 970): 175 PSI; Residual Indent: Less than 0.005-inches
 - 2) Fire Test Data:
 - (a) Flame Spread (ASTM E 648): Class I.
 - (b) Smoke Density (ASTM E 662): Less than 450.
 - i. Compliance: ASTM F1700, Class III, Type B - Embossed
 - j. Warranty: 10-Year Limited Commercial Warranty
- B. Seams:
- 1. Heat Welded Seams:
 - a. Provide vinyl weld rod. Color of weld rod shall be compatible with field color of flooring or as selected by Architect to contrast with field color of flooring.

- 1) Weld rods shall be sealed after installation. Provide weld rod coating pen from manufacturer.
2. Chemically Bonded Seams: Provide seam adhesive at seams as recommended by the resilient flooring manufacturer.
- C. Integral Flash Cove Base:
 1. Where indicated, provide integral flash cove wall base by extending sheet flooring 6-inches up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer.
 2. Integral Flash Cove Base: Designated on the Interior Finish Legend in the Drawings as Finish Type IB- #.
 - a. Type IB-1:
 - 1) Material: Match Type SV-1
 - 2) Height: 6-inches
 - b. Type IB-2:
 - 1) Material: Match Type SV-2
 - 2) Height: 6-inches
 - c. Type IB-3: Refer to Section 09 69 23 for requirements.
 3. Accessories:
 - a. Cove Strip: 1-inch (25-mm) radius provided or approved by manufacturer; plastic.
 - b. Cap Strip: Square metal cap provided or approved by manufacturer.
 - c. Corners: Metal inside and outside corners and end stops provided or approved by manufacturer.

2.04 RESILIENT TILE FLOORING

- A. Owner Standard: The resilient tile flooring products specified in this Section are restricted to the manufacturers and products indicated.
- B. Luxury Vinyl Floor Tile (LVT):
 1. Luxury Vinyl Floor Tile: Designated in the Drawings as Finish Type LVT- #.
 2. Type LVT-1:
 - a. Manufacturer: Mannington.
 - b. Product: Amtico - Wood
 - c. Color: #AROW8200 - Regency Walnut
 - d. Total Thickness: 2.5-mm
 - e. Size: 4-1/2 inches by 36-inches
 - f. Installation Method: Random.
 - g. Performance:
 - 1) Static Load (ASTM F970): 2,000 PSI; Residual Indent ≤ 0.005 "
 - 2) Fire Test Data:
 - (a) Flame Spread (ASTM E 648): Class I.
 - (b) Smoke Density (ASTM E 662): Less than 450.
 - h. Compliance: ASTM F1700 Class III, Type B
 - i. Warranty: Limited 20 Year Commercial Warranty; Limited 20 Year Quantum Guard® HP Wear Warranty
 3. Type LVT-2:
 - a. Manufacturer / Product: Mannington.
 - b. Style: Amtico Stone
 - c. Color: AROSTV13 - Corinthian Marble
 - d. Total Thickness: 2.5-mm
 - e. Size: 18-inches by 18-inches
 - f. Installation Method: Ashlar.
 - g. Performance:
 - 1) Static Load (ASTM F970): 2,000 PSI; Residual Indent ≤ 0.005 "
 - 2) Fire Test Data:
 - (a) Flame Spread (ASTM E 648): Class I.

- (b) Smoke Density (ASTM E 662): Less than 450.
 - h. Compliance: ASTM F1700 Class III, Type B
 - i. Warranty: Limited 20 Year Commercial Warranty; Limited 20 Year Quantum Guard® HP Wear Warranty
- C. Static Control (Dissipative) Tile Flooring (SDT):
 - 1. Static Control Tile: Designated on the Interior Finish Legend in the Drawings as Finish Type SDT-#.
 - 2. Type SDT-1:
 - a. Manufacturer: Armstrong Flooring, Inc
 - b. Product: Excelon SDT
 - c. Description: Static dissipative vinyl tile composed of polyvinyl chloride resin, plasticizers, fillers, pigments, and antistatic additive with colors and texture dispersed uniformly throughout its thickness.
 - d. Compliance: SDT shall meet size, thickness, indentation, impact, deflection, dimensional stability, resistance to chemicals, squareness, and resistance to heat requirements of ASTM F 1066 - Standard Specification for Vinyl Composition Tile, Class 2, through pattern.
 - e. Color: #51950 - Marble Beige
 - f. Thickness: 1/8-inch (3.2-mm)
 - g. Size: 12" x 12"
 - h. Installation Method: Monolithic.
 - i. Accessories:
 - 1) Copper Grounding Strips: 2-inch (5.08 cm) wide x 24-inch (60.96 cm) long copper ground-connection strips for under the tile.
 - 2) Floor Polish: S-392 Static Dissipative Tile Polish for application as initial and on-going static dissipative maintenance finish.
 - j. Fire Test Data:
 - 1) Flame Spread (ASTM E 648): Class I.
 - 2) Smoke Evolution (ASTM E 662): Less than 450.
 - k. Electrical Properties: Provide flooring material to meet the following electrical properties when installed according to manufacturer's instructions with the required adhesive, copper strips and SDT floor finish:
 - 1) ASTM 7.1: 106-109 ohms, point-to-point and point-to-ground.
 - 2) ASTM F150 - Electrical Resistance of Flooring: 10(6) to 10(9) ohms, point-to-point and point-to-ground.
 - 3) ASTM 97.1: Floor Materials and Footwear-Resistance in Combination with a Person results between 10(6) and 10(9) ohms (average) with dissipative footwear and when using heel straps.
 - 4) ASTM 97.2: 30 volts (average) with dissipative footwear at 12% relative humidity.
 - 5) Static Dissipation @ 12% RH: Flooring in combination with a person wearing dissipative footwear: 1000 to 100 volts; 0.2 seconds maximum.
 - l. Adhesive: Armstrong #S-202 Static Dissipative Tile Adhesive.
 - m. Warranty:
 - 1) Manufacturer Limited Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of five (5) years from Date of Substantial Completion.
 - 2) Extended System Limited Warranty: Manufacturer shall repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails, for a period of ten (10) years, on top of the limited warranty, from Date of Substantial Completion.

2.05 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.
- C. Edge Protection:
 - 1. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition. Refer to Section 09 65 13.
 - 2. Provide metal edge protection products of width shown on the drawings, and of required thickness to protect exposed edges of the flooring. Refer to Section 09 30 50.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

3.02 PREPARATION

- A. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below.
- B. Subfloor Relative Humidity and pH Testing: Refer to Section 01 45 00 for requirements.
 - 1. Conduct tests by an independent testing agency acceptable to Owner.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- C. Subfloor Moisture Testing:
 - 1. Perform anhydrous calcium chloride test, per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours, or as required by the manufacturer.
 - 2. Proceed with installation only after substrates pass testing.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- E. Do not install floor coverings until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.03 INSTALLATION

- A. Install flooring in strict accordance with manufacturer's written instructions.
- B. General Requirements:
 - 1. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
 - 2. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
 - 3. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
 - 4. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.

5. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
 - a. Fit joints and butt seams tightly.
 - b. Set flooring in place, press with heavy roller to attain full adhesion.
6. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
7. Install flooring on recessed floor access covers, maintaining floor pattern.
- C. Static Control Flooring: Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions.
- D. Resilient Sheet Flooring:
 1. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
 2. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
 3. Seams:
 - a. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
 - b. Chemically-Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless floor covering. Prepare seams and apply compound to produce tightly-fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.
 4. Integral Flash Cove Base: Cove resilient floor coverings 6 inches (152 mm) up vertical surfaces where indicated on drawings. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.
 - a. Install metal corners at inside and outside corners.
- E. Resilient Tile Flooring:
 1. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - a. Lay tiles in pattern indicated, or verify with Architect.
 2. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 3. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
 4. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
 5. Install plank tile with a random offset of at least 6 inches (152 mm) from adjacent rows.
- F. Resilient Base and Edge Protection: Refer to Section 09 65 13 for requirements.
- G. Resilient Stair Coverings: Refer to Section 09 65 13 for requirements.
- H. Metal Edge Protection: Refer to Section 09 30 50 for requirements.

3.04 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
- B. Perform the following operations immediately after completing floor covering installation:
 1. Remove adhesive and other blemishes from floor covering surfaces.
 2. Sweep and vacuum floor coverings thoroughly.
 3. Damp-mop floor coverings to remove marks and soil.
- C. Prohibit traffic on resilient flooring for 48 hours after installation.
- D. Protect floor coverings from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

- E. Joint Sealant: Apply sealant around columns, at door frames, and at other joints and penetrations.
- F. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products.
 - 1. Sealer: Apply two base coats of liquid sealer.

END OF SECTION

SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Resilient wall base.
- B. Resilient molding accessories.

1.03 RELATED REQUIREMENTS

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. Section 09 65 00 - Resilient Flooring
- C. Section 09 68 13 - Tile Carpeting
- D. Section 09 69 23 - Resinous Flooring, Base, and Walls

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12-inches (300 mm) long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.05 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.07 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.08 EXTRA MATERIALS

- A. Deliver extra resilient base units for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.

1. Furnish not less than 10 linear feet for every 500 linear feet, or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.09 WARRANTY

- A. Warranty: Provide manufacturer's standard warranty against manufacturing defects in material or workmanship during the warranty period.
 1. Warranty Period: One (1) year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Resilient Base and Accessories:
 1. Specified Manufacturer: Roppe Corporation.
 - a. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1) Johnsonite
 - 2) Flexco, Inc.
 - 3) Burke Flooring.

2.02 MATERIALS

- A. Rubber Wall Base and Accessories: Meet or exceed the requirements of ASTM F1861, Type TS (Thermoset) rubber formulations, Group 1 (solid, homogeneous).
 1. Construction: 100% vulcanized homogenous rubber compound comprised of a premium blend and SBR rubber materials.

2.03 PERFORMANCE REQUIREMENTS

- A. Materials shall meet or exceed the following performance criteria:
 1. Flame Spread / Smoke Density (ASTM E84): Class B.
 2. Flammability / Critical Radiant Flux (ASTM E648): Class I.
 3. Smoke Density (ASTM E662): < 450: Passes.
 4. Flexibility (ASTM F137): Passes.
 5. Color Stability: Meets or exceeds ASTM F1861 requirements for color stability when tested to ASTM F1515.
 6. Chemical Resistant (ASTM D925): Passed.
 7. SCS FloorScore® Certified.
- B. Manufacturing facility shall be ISO 9001 and ISO 14001 Certified.

2.04 RESILIENT BASE

- A. Resilient Base: Designated on the Interior Finish Legend in the Drawings as Finish Type RWB- #.
- B. Type RWB-1:
 1. Product: Roppe; Pinnacle Plus.
 - a. Thickness: 3/8-inch.
 - b. Height: 4-5/8 inches.
 - c. Color: #110 - Brown.
 - d. Profile: Toeless (Straight), Model #65.
 - e. Length: 8-foot lengths.
 2. Adhesive: As recommended by Manufacturer.
 3. Installation:
 - a. Outside Corners: Preformed.
 - b. Inside Corners: Job formed.
- C. Type RWB-2:
 1. Product: Roppe; Pinnacle Standard.
 - a. Thickness: 1/8 inch.
 - b. Height: 4 inches.
 - c. Color: #110 - Brown.

- d. Profile: Toe (Coved).
- e. Length: 120-foot coils.
- 2. Adhesive: As recommended by Manufacturer.
- 3. Installation:
 - a. Outside Corners: Preformed.
 - b. Inside Corners: Job formed.

2.05 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 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 practicable 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. Preformed Corners: Install preformed corners before installing straight pieces.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.04 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.05 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Modular, tufted carpet tile.

1.03 RELATED REQUIREMENTS

- A. Section 01 45 00 - Concrete In-Situ Relative Humidity and pH Testing
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 09 30 50 - Metal Edge Protection and Transition Profiles
- D. Section 09 65 13 - Resilient Base and Accessories
- E. Section 09 68 16 - Sheet Carpeting

1.04 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2015.
- B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2017a.

1.05 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Shop Drawings: Show 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 of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
 - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.07 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.08 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.09 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Master II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockups at locations and in sizes shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Comply with CRI 104.

1.11 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.12 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
 - 3. Warranty Period: Life of the carpet.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer: Subject to compliance with the Contract Documents, provide products from the manufacturer's specified in this Section, no exceptions.
 - 1. Substitutions will not be considered for other materials and products that are not specified in this Section.

2.02 WALK-OFF TILE CARPETING

- A. Owner Standard: The TILE CARPETING products specified in this Section are restricted to the manufacturers/products indicated, no exceptions.
- B. Walk-Off Tile Carpeting: Designated on the Interior Finish Legend in the Drawings as Finish Type WOC- #.
- C. Type WOC-1:
 - 1. Manufacturer: Tandus Centiva
 - 2. Product: Assertive Stria #04839
 - 3. Description: Textile Flooring
 - 4. Design: Patterned Loop Pile
 - 5. Color: #26207 - Lead Shot
 - 6. Module Size: 24" x 24"
 - 7. Installation Method: Vertical Ashlar
 - 8. Warranty: Lifetime Limited
 - 9. Product Testing:
 - a. Radiant Panel (ASTM E648): Class I
 - b. Smoke Density (ASTM E662): Less than 450
 - c. Electrostatic Propensity (AATCC 134): Less than 3.0 Kv.

2.03 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Moldings, Transition and Edge Strips:
 - 1. Resilient Trim: Refer to Section 09 65 13 .

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
 - 1. Test in accordance with Section 01 45 00.
 - 2. Conduct tests by an independent testing agency acceptable to Owner.
 - 3. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.03 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.
- H. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.04 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 69 23

HIGH-PERFORMANCE RESINOUS FLOOR AND WALL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. High-Performance Resinous Flooring Systems (from here on referred to as "Seamless Flooring")
- B. High-Performance Resinous Wall Systems (from here on referred to as "Seamless Walls")
- C. Seamless integral cove base

1.03 RELATED REQUIREMENTS

- A. Section 01 45 00 - Concrete In-Situ Relative Humidity and pH Testing
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 04 20 00 - Brick and Concrete Masonry
- D. Section 09 21 16 - Gypsum Board Assemblies

1.04 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Submit details of construction; include relationship with adjacent construction.
- C. Selection Samples: For each finish product specified complete sets of color chips representing manufacturer's full range of available colors and patterns.
 - 1. Submit manufacturer's standard color chart. Computerized custom color matching shall be available upon request. Furnish required number of sets of this information for review and selection.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square representing actual product, color, and patterns.
 - 1. Submit a cured system sample which the Contractor has made for verification purposes and finish texture approval.
- E. Maintenance Data: For maintenance manuals.

1.05 INFORMATION SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system.

1.06 CLOSEOUT SUBMITTALS

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

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain materials from a single manufacturer with a minimum of five years verifiable experience providing materials of the type specified in this section.
- B. Installer Qualifications:
 - 1. Installation shall be performed by a manufacturer approved installer with skilled mechanics having not less than three years satisfactory experience in the installation of the type of

system as specified in this section, and shall be approved in writing by the manufacturer of the seamless flooring and wall systems.

- C. Source Limitations: Obtain primary resinous materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

1.08 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. The Contractor shall visit the jobsite prior to the installation of the seamless flooring and wall systems to evaluate substrate condition, including substrate moisture transmission, quantity and severity of cracking, and the extent of repairs needed. Substrate imperfections should be repaired only after mechanical preparation of the substrate. Surface preparation reveals most imperfections requiring repair. Concrete substrates shall be tested to verify that the moisture vapor transmission of the substrate does not exceed the manufacturers' recommendations.
- C. Concrete subfloor tolerances shall be in accordance with ACI 302. Each drain in the installation area shall be working and raised or lowered to the actual finished elevation of the seamless flooring.
- D. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during application of seamless flooring and wall system.
- E. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

1.11 WARRANTY

- A. Installation Warranty: The Contractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Desco Coatings, Inc. (P: 800-426-4164).
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PERFORMANCE REQUIREMENTS

- A. Physical Properties:
 - 1. Compressive Strength (ASTM C579): 9,200 psi
 - 2. Tensile Strength ASTM C307: 1,650 psi
 - 3. Flexural Modulus of Elasticity (ASTM C580): 4,000 psi
 - 4. Abrasion Resistance (ASTM D4060): 0.080 mg maximum weight loss
 - 5. Hardness (ASTM D2240): 85-90, Shore D
 - 6. Bond Strength (ASTM D4541): 425 psi
- B. System Chemical Resistance: Test specimens of cured seamless flooring and wall system are unaffected when tested according to in the following reagents for no fewer than 21 days: 20% Hydrochloric Acid, Urine, Coffee, Ethyl Alcohol, 10% Lactic Acid, Tea, Mustard, Mercurochrome, or Betadyne.
- C. Recommended Moisture Vapor Transmission Considerations:

1. Placement of slabs-on-grade over a Class A vapor retarder as defined by ASTM E145.
 2. A water cement ratio of 0.45 and 0.5.
 3. Curing by ASTM C171 sheet materials for curing concrete.
 4. A slump in the range of 3 to 4 inches which can be increased by the use of super plasticizers.
- D. Flame Spread: ASTM E84
1. Results shall be rated as Class A.
 - a. Flame Spread below 25.
 - b. Smoke Development, 100

2.03 MATERIALS

- A. Seamless Flooring and Wall Materials:
1. Primer: Type recommended by manufacturer for substrate and system indicated.
 - a. Formulation: 100% solids, High solids, or Water-based.
 2. Body Coats: 100% solids clear/epoxy resin.
 3. Aggregate: Colored quartz, ceramic-coated silica.
 4. Grout Coat: 100% solids clear/epoxy resin.
 5. Topcoat(s): 100% solids clear/epoxy resin.
 - a. Finish: Matte.

2.04 SEAMLESS FLOORING AND WALLS

- A. Seamless Flooring and Walls: Designate in the Drawings as Finish Type RF- #.
- B. Type RF-1 (Seamless Flooring) and RF-2 (Seamless Walls):
1. Product: Desco; Quartz Cremona TG.
 - a. Description: Abrasion-, impact- and chemical-resistant, decorative-aggregate-filled, epoxy-resin-based, monolithic floor and wall covering designed to produce a seamless installation.
 - b. System Characteristics:
 - 1) Overall System Thickness: 1/4-inch (6.4 mm).
 - 2) Surface Texture:
 - (a) Floors: Standard Slip Resistant
 - (b) Walls: Orange Peel, subject to Architects approval of sample mock-up.
 - 3) Application Method: Hand troweled - No broadcasting of aggregate allowed.
 - 4) Color:
 - (a) RF-1: Refer to Finish Schedule for SLH Standard Color.
 - (b) RF-2: Refer to Finish Schedule for SLH Standard Color.
 - c. Body Coats:
 - 1) Resin: Epoxy.
 - 2) Formulation Description: High solids.
 - 3) Application Method: Hand troweled.
 - (a) Thickness of Coats: 1/8 inch (3.2 mm).
 - (b) Number of Coats: 2.
 - 4) Aggregates: Grade 11 quartz aggregate with 20% of grade 28 as a filler.
 - d. Topcoat: Sealing or finish coats.
 - 1) Resin: Urethane.
 - 2) Formulation Description: as recommended by manufacturer for desired effect.
 - 3) Type: Clear.
 - 4) Finish: as selected by the Architect from approved samples and mock-up flooring area.
 - 5) Number of Coats: One or Two as may be required for desired finish texture.

2.05 SEAMLESS INTEGRAL COVE BASE

- A. Integral Cove Base: Provide a turned-up cove base with 1-inch radius cove as indicated on drawings.
1. Integral Cove Base, designated in the drawings as Finish Type IB-3.

2. Height: 6 inch.
3. Color: Match RF-1.
4. Texture: Orange Peel

2.06 ACCESSORIES

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
- B. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated.
- C. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.
 1. Formulation Description: As recommended by manufacturer.
 - a. Provide fiberglass scrim embedded in reinforcing membrane.
- D. Patching and Fill Material: Resinous product of or approved by manufacturer and recommended by manufacturer for application indicated.
- E. Binder and all successive grout and top coats shall be 100% solids clear/epoxy resin. Ceramic coated quartz aggregates are to be used to achieve all color. No pigmented epoxy base or top coats allowed.
- F. Final top coat material and texture shall be determined by reviewing material samples with ranges of texture. Urethane UV resistant clear topcoat with approved grit and quantity shall be applied to all areas unless otherwise noted.

PART 3 - EXECUTION

3.01 TESTING OF CONCRETE SUBSTRATE

- A. One of the following methods shall be used to determine moisture content of concrete substrate at time of application:
 1. ASTM F-2170 In-situ Relative Humidity Test.
 - a. Refer to Section 01 45 00 for requirements.
 2. ASTM F-1869 Calcium Chloride Moisture Vapor Transmission Test.
 - a. Follow test procedures of manufacturer of MVT kits.
 - b. Results should be below 3 to 4 lbs/1,000 sf/24 hours.
- B. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
 1. Refer to Section 01 45 00 for requirements.

3.02 PREPARATION

- A. General: Prepare and clean substrates according to manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for seamless flooring and wall application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous systems.
 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
 2. Repair damaged and deteriorated concrete according to manufacturer's written instructions.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through seamless flooring and walls, according to manufacturer's written instructions.

3.03 APPLICATION

- A. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- B. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.
 - 1. Apply waterproofing membrane to integral cove base substrates.
- C. Applying reinforcing membrane only to substrate cracks.
- D. Apply reinforcing membrane to substrate cracks.
- E. Seamless Floor and Wall Covering - Application:
 - 1. Apply components of seamless floor and wall covering according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - a. Coordinate application of components to provide optimum adhesion of resinous system to substrate, and optimum intercoat adhesion.
 - b. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - c. At substrate expansion and isolation joints, comply with manufacturer's written instructions.
 - 2. Apply self-leveling slurry body coats, troweled body coats, grout coats and topcoats per manufacturer requirements.
 - 3. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- F. Seamless Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
 - 1. Cove Base Height: 6 inches.

3.04 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.05 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Surface preparation and field painting of exposed exterior items and surfaces.

1.03 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications
- B. Section 05 51 00 - Metal Stairs
- C. Section 04 20 00 - Brick and Concrete Masonry
- D. Section 07 92 00 - Joint Sealants
- E. Section 09 21 16 - Gypsum Board Assemblies
- F. Section 09 91 23 - Interior Painting

1.04 DEFINITIONS

- A. Refer to Section 09 91 23 - Interior Painting

1.05 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- D. SSPC-SP 1 - Solvent Cleaning; 2015.
- E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- F. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

1.06 SUBMITTALS

- A. Refer to Section 09 91 23 - Interior Painting

1.07 CLOSEOUT SUBMITTALS

- A. Refer to Section 09 91 23 - Interior Painting

1.08 EXTRA MATERIALS

- A. Deliver extra resilient base units for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
 - 1. Paint: One (1) unopened gallon can of each color and sheen specified.
 - a. Label each container with color in addition to the manufacturer's label.
 - b. Include one copy of the Interior Finish Schedule with the paint material.
 - c. Include MSDS information for all materials delivered.

1.09 QUALITY ASSURANCE

- A. Refer to Section 09 91 23 - Interior Painting

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 09 91 23 - Interior Painting

1.11 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

1.12 WARRANTY

- A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to insure proper preparation prior to application. All thinners, fillers, primers and finish coatings shall be from the same manufacturer to support a product warranty. Products other than those submitted shall be accompanied by a letter stating its fitness for use and compatibility.
- B. Manufacturer Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of one (1) year from Date of Substantial Completion.
- C. The painting contractor shall furnish a guarantee to repair or replace any or all work which is found to be defective in workmanship or materials, together with any adjacent work disturbed by rectifying the defective work, for two (2) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: The Sherwin-Williams Paint Company;
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.
 - 2. Manufacturer Contacts:
 - a. Corporate: P: (800) 474-3794 / Web: www.sherwin-williams.com.
 - b. Local Sales Rep: Brook Nienstedt: P: (913) 381-8633 / E-mail: brook.b.nienstedt@sherwin.com.
- B. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.02 MATERIALS - GENERAL

- A. Volatile Organic Compound (VOC) Content:
 - 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D-National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- B. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.03

2.04 MIXING AND TINTING

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
- B. MPI Standards: Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.

- C. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
- D. Unless noted otherwise, typical paint system consists of:
 - 1. One (1) Coat of Primer/Filler
 - 2. One (1) Intermediate Coat
 - 3. One (1) Top Coat
- E. Tinting of Paint Finishes: Tint each coat as follows:
 - 1. Primer Coat: Do NOT tint primer coat.
 - 2. Intermediate Coat/s: Tint intermediate coat/s as base color, applied with a FLAT sheen.
 - 3. Top Coat: Final finish coat shall be applied as base color with the specified sheen.
- F. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- G. Flammability: Comply with applicable code for surface burning characteristics.

2.05 PAINT FINISHES - COLOR AND SHEEN

- A. Paint Finishes: Designated on the Interior Finish Legend in the Drawings as Finish Type P- #.
 - 1. Paint Type P-1 thru P-11: Refer to Finish Schedule for SLH Standard Color and Sheen.
- B. Epoxy Paint Finishes: Designated on the Interior Finish Legend in the Drawings as Finish Type EP- #.
 - 1. Paint Type EP-1 thru EP-11: Refer to Finish Schedule for SLH Standard Color and Sheen.

2.06 PERFORMANCE REQUIREMENTS

- A. Products to be independently certified by UL Environment in accordance with "UL 2818 -GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes and Furnishings."
- B. Comply with California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1" (CA Section 01 35 00 - Special Procedures) and V1.2-2017.

2.07 SCOPE OF WORK

- A. Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
 - 2. Cementitious material and soffits where indicated.
 - 3. Concrete walls where indicated.
 - 4. Exterior hollow metal doors and frames where indicated.
- B. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to remain unfinished.
 - 3. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 4. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
 - 5. Marble, granite, slate, and other natural stones.
 - 6. Brick and cast stone.
 - 7. Glass.
 - 8. Ferrous and Galvanized Metal (primed and un-primed).

2.08 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

2.09 ACCESSORY MATERIALS

- A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

2.10 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Architect.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the materials to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

2.11 EXTERIOR PAINTING SCHEDULE

- A. Exterior Concrete (if applicable): Provide the following finish systems over exterior concrete substrates.
 - 1. Two finish coats over a primer.
 - a. Primer: Sherwin Williams; S-W Loxon Concrete and Masonry Primer Sealer, A24W8300.
 - 1) Except for "touch-up" prime coat may be omitted.
 - b. Finish Coats (2): Sherwin Williams; A-100® Exterior Latex Satin, A82 Series.
- B. Exterior Concrete Masonry Units: Provide the following finish systems over exterior concrete masonry unit substrates.
 - 1. Two finish coats over a primer.
 - a. Primer: Sherwin Williams; S-W PrepRite Block Filler. Applied at a dry film of not to exceed 8 mils.
 - 1) Except for "touch-up" prime coat may be omitted.
 - b. Finish Coats (2): Sherwin Williams; A-100® Exterior Latex Satin, A82 Series.
- C. Exterior Ferrous and Non-Ferrous (Galvanized) Metal: Provide the following finish systems over exterior ferrous and non-ferrous metal.
 - 1. Two finish coats over a rust-inhibitive primer.
 - 2. Primer: Sherwin Williams; S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - a. Galvanized Metal Surfaces: Chemically treat with a compound designed for this purpose in accordance with the manufacturer's directions before applying the first coat of primer.
 - b. Shop Primed Surfaces: Except for "touch-up" prime coat may be omitted.
 - 3. Finish Coats (2): Sherwin Williams; Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series.

2.12 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- C. Examine surfaces scheduled to be finished, with Applicator present, prior to commencement of work. Report any condition that may potentially effect proper application.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Exterior Plaster and Stucco: 12 percent.
 - 2. Fiber Cement Siding: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Remove or repair existing paints or finishes that exhibit surface defects.
- C. Remove or mask surface appurtenances prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete Substrates:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- G. Masonry Substrates:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
 - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1500 psi (4140 to 10,350 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.
- H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- I. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
- J. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- K. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- L. Ferrous Metal Surfaces: Remove rust, loose mill scale, and other foreign substances using any of the following methods:
 - 1. Solvent Clean according to SSPC-SP 1.
 - 2. Hand Tool Clean according to SSPC-SP 2.
 - 3. Power Tool Clean according to SSPC-SP 3.
- M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- N. Material Preparation: Carefully mix and prepare costing materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying coating in a clean condition, free of foreign materials and residue.

2. Stir material before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
3. Use only the type of thinners approved by manufacturer and only within recommended limits.

3.03 APPLICATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendation.
- B. Do not apply to wet or damp surfaces.
 1. Test substrates for moisture content.
- C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
 1. The number of coats and film thickness required is the same regardless of application method.
 2. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.
- D. Uniformly apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, drips or sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
- F. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).
- G. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- H. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- I. Sand metal surfaces lightly between coats to achieve required finish.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
- B. Painted exterior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent upon inspection:
 1. Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 2. evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- C. Painted surfaces shall be considered unacceptable if any of the following are evident under daylight conditions for exterior surfaces:

1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
4. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.

3.05 CLEANING

- A. Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- B. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

3.06 PROTECTION AND REPAIR

- A. Provide "Wet Paint" signs to protect newly painted finishes.
- B. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- C. Protect work of other trades against damage from painting by providing surface-applied protection prior to preparation and painting. After completing painting operations, remove temporary protective wrappings.
- D. Protect completed coating applications from damage by subsequent construction activities until completion of painting project.
- E. Touch-up coatings damaged by subsequent construction activities.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Surface preparation and the field application of paints, stains, and varnishes on interior substrates.

1.03 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications
- B. Section 05 51 00 - Metal Stairs
- C. Section 04 20 00 - Brick and Concrete Masonry
- D. Section 07 92 00 - Joint Sealants
- E. Section 09 21 16 - Gypsum Board Assemblies
- F. Section 09 91 13 - Exterior Painting
- G. Division 21 - Fire Protection
- H. Division 22 - Plumbing
- I. Division 26 - Electrical

1.04 DEFINITIONS

- A. DFT: Dry Film Thickness.
- B. DTM: Direct To Metal.
- C. VOC: Volatile Organic Compounds.
- D. Paint Gloss Levels:
 - 1. Flat - Less than 5 Percent.
 - 2. Eggshell - 5 - 20 Percent.
 - 3. Satin - 20 - 35 Percent.
 - 4. Semi-Gloss - 30 - 65 Percent.
 - 5. Gloss - Over 65 Percent.

1.05 SUBMITTALS

- A. Product Data: Provide a complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category.
 - 2. Cross-reference to specified paint system(s) that the product is to be used in; include description of each system.
- B. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - a. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as factory finished metals, have been approved.
- C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.

- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

1.06 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.07 EXTRA MATERIALS

- A. Deliver extra resilient base units for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
 - 1. Paint: One (1) unopened gallon can of each color and sheen specified.
 - a. Label each container with color in addition to the manufacturer's label.
 - b. Include one copy of the Interior Finish Schedule with the paint material.
 - c. Include MSDS information for all materials delivered.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.
- C. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- E. All materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- F. All paint manufacturers and products used shall be as listed under the Approved Product List section of the MPI Painting Manual.
- G. Coordination:
 - 1. Provide finish coats which are compatible with the prime coats actually used.
 - 2. Review other Sections of these Specifications as required, verifying the primer coats to be used and assuring compatibility of the total coating system for the various substrate.
 - 3. Furnish information on the characteristics of the specific finish materials to assure that compatible primer coats are used.
 - 4. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.
 - 5. Notify the Architect in writing of anticipated problems in using the specified coating system over prime-coatings supplied under other Sections.

1.09 MOCK-UP

- A. Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - 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.
- B. Provide door and frame assembly illustrating paint color, texture, and finish.
- C. Mock-up may remain as part of the work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Disposal:
1. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store safely for future use.
 2. Do not incinerate closed containers.
 3. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

1.11 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

1.12 WARRANTY

- A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to insure proper preparation prior to application. All thinners, fillers, primers and finish coatings shall be from the same manufacturer to support a product warranty. Products other than those submitted shall be accompanied by a letter stating its fitness for use and compatibility.
- B. Manufacturer Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of one (1) year from Date of Substantial Completion.
- C. The painting contractor shall furnish a guarantee to repair or replace any or all work which is found to be defective in workmanship or materials, together with any adjacent work disturbed by rectifying the defective work, for two (2) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: The Sherwin-Williams Paint Company;
1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.
 2. Manufacturer Contacts:
 - a. Corporate: P: (800) 474-3794 / Web: www.sherwin-williams.com.
 - b. Local Sales Rep: Brook Nienstedt: P: (913) 381-8633 / E-mail: brook.b.nienstedt@sherwin.com.
- B. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.02 MATERIALS - GENERAL

- A. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D-National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- B. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.03 MIXING AND TINTING

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
- B. MPI Standards: Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
- C. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
- D. Unless noted otherwise, typical paint system consists of:
 1. One (1) Coat of Primer/Filler
 2. One (1) Intermediate Coat
 3. One (1) Top Coat
- E. Tinting of Paint Finishes: Tint each coat as follows:
 1. Primer Coat: Do NOT tint primer coat.
 2. Intermediate Coat/s: Tint intermediate coat/s as base color, applied with a FLAT sheen.
 3. Top Coat: Final finish coat shall be applied as base color with the specified sheen.
- F. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.04 PAINT FINISHES - COLOR AND SHEEN

- A. Paint Finishes: Designated on the Interior Finish Legend in the Drawings as Finish Type P- #.
 1. Paint Type P-1 thru P-11: Refer to Finish Schedule for SLH Standard Color and Sheen.
- B. Epoxy Paint Finishes: Designated on the Interior Finish Legend in the Drawings as Finish Type EP- #.
 1. Paint Type EP-1 thru EP-11: Refer to Finish Schedule for SLH Standard Color and Sheen.

2.05 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
- B. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- B. Examine surfaces scheduled to be finished, with Applicator present, prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 5. Concrete Floors and Traffic Surfaces: 8 percent.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 1. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- G. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board Substrates: Fill minor defects with filler compound. Spot prime defects after repair.
- J. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- K. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- L. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- M. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- O. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - a. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
 - 1. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Prime surfaces to receive wall coverings.
 - 3. Painting of Exposed Roof Structure:
 - a. In finished occupied areas, paint roof deck, bar joists, girders, beams, and columns, unless otherwise indicated.
 - 4. Painting of Mechanical and Electrical Materials Exposed to View:
 - a. In finished occupied areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers and grilles to match face panels.
- J. Do NOT paint or finish the following work items:

1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 2. Items indicated to receive other finishes.
 3. Items indicated to remain unfinished.
 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 6. Marble, granite, slate, and other natural stones.
 7. Floors, unless specifically indicated.
 8. Ceramic and other tiles.
 9. Glass.
 10. Wall, ceilings, floors, and mechanical/electrical work located in utility, mechanical, and electrical spaces, unless indicated otherwise.
 11. Acoustical materials, unless specifically indicated.
 12. Concealed pipes, ducts, and conduits.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
- B. Painted interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent upon inspection:
1. Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 2. evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- C. Painted surfaces shall be considered unacceptable if any of the following are evident under daylight conditions for exterior surfaces:
1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 4. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.

3.05 PROTECTION AND REPAIR

- A. Provide "Wet Paint" signs to protect newly painted finishes.
- B. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

- C. Protect work of other trades against damage from painting by providing surface-applied protection prior to preparation and painting. After completing painting operations, remove temporary protective wrappings.
- D. Protect completed coating applications from damage by subsequent construction activities until completion of painting project.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 CLEANING

- A. Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- B. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

PART 4 - SCHEDULE

4.01 INTERIOR COATING SYSTEMS - WALL SURFACES

- A. Concrete and Concrete Masonry Units (CMU):
 - 1. Latex System:
 - a. Semi-Gloss Finish:
 - 1) Filler: PrepRite® Block Filler, B25W25
 - 2) Intermediate Coat: ProMar® 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
 - 3) Top Coat: ProMar® 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series
 - b. Eg-Shel Finish:
 - 1) Filler: PrepRite® Block Filler, B25W25
 - 2) Intermediate Coat: ProMar® 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series
 - 3) Top Coat: ProMar® 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series
 - 2. Pre-Catalyzed Waterbased Epoxy System:
 - a. Semi-Gloss Finish:
 - 1) Primer: PrepRite® Block Filler, B25W25
 - 2) Intermediate Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy, Semi-Gloss, K46-151 Series
 - 3) Top Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy, Semi-Gloss, K46-151 Series
 - b. Eg-Shel Finish:
 - 1) Filler: PrepRite® Block Filler, B25W25
 - 2) Intermediate Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Eg-Shel, K45-151 Series
 - 3) Top Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Eg-Shel, K45-151 Series
- B. Gypsum Board Substrates:
 - 1. Institutional Low-Odor/VOC Interior Latex System:
 - a. Eg-Shel Finish:
 - 1) Primer: Harmony Interior Latex Primer, B11W900 Series
 - 2) Intermediate Coat: Harmony Interior Latex Flat
 - 3) Top Coat: Harmony Interior Latex Eg-Shel, B9 Series
 - 2. Interior Epoxy-Modified Latex System:
 - a. Gloss Finish:
 - 1) Primer: ProMar® 200 Zero VOC Latex Primer, B28W2600
 - 2) Intermediate Coat: Pro Industrial™ Waterbased Catalyzed Epoxy Gloss, B73-300 Series
 - 3) Top Coat: Pro Industrial™ Waterbased Catalyzed Epoxy Gloss, B73-300 Series

4.02 INTERIOR COATING SYSTEMS - CEILING AND SOFFIT SURFACES

A. Gypsum Board:

1. Institutional Low Odor/VOC Interior Latex System:
 - a. Flat Finish:
 - 1) Primer: Harmony Interior Latex Primer, B11W900 Series
 - 2) Intermediate Coat: Harmony Interior Latex Flat, B9 Series
 - 3) Top Coat: Harmony Interior Latex Flat, B9 Series

4.03 INTERIOR COATING SYSTEMS - FLOOR SURFACES

A. Concrete Floors:

1. Light Duty Industrial Floor Coatings:
 - a. Acrylic Systems:
 - 1) 1st Coat: ArmorSeal® Tread-Plex™ Waterbased Acrylic Primer , B90 Series
 - 2) 2nd Coat: ArmorSeal® Tread-Plex™, B90 Series
 - 3) 3rd Coat: ArmorSeal® Tread-Plex™, B90 Series
2. Moderate Duty Industrial Floors:
 - a. Water Based Epoxy Primer / Water Based Epoxy Coating System:
 - 1) 1st Coat: ArmorSeal Water Based Epoxy Primer/Sealer Clear, B70VQ10
 - 2) 2nd Coat: ArmorSeal® 8100 Water Based Epoxy, B70-8100 Series
 - 3) 3rd Coat: ArmorSeal® 8100 Water Based Epoxy, B70-8100 Series
 - b. Epoxy System:
 - 1) 1st Coat: ArmorSeal 1000 HS Epoxy, B67-2000 Series
 - 2) 2nd Coat: ArmorSeal 1000 HS Epoxy, B67-2000 Series
 - 3) 3rd Coat (optional): ArmorSeal 1000 HS Epoxy, B67-2000 Series
3. Heavy Duty Industrial Floors:
 - a. Epoxy / HS Polyurethane System:
 - 1) 1st Coat: ArmorSeal 1000 HS Epoxy, B67-2000 Series
 - 2) 2nd Coat: ArmorSeal HS Polyurethane, B65-220 Series
 - 3) 3rd Coat (optional): ArmorSeal HS Polyurethane, B65-220 Series

B. Wood Floors:

1. Semi-Transparent Stain Finish:
 - a. 1st Coat: S-W Minwax Performance Series Tintable Wood Stain 550 VOC
 - b. 2nd Coat: S-W Minwax Waterbased Oil-Modified Polyurethane
 - c. 3rd Coat: S-W Minwax Waterbased Oil-Modified Polyurethane
 - d. Sheen: Gloss, Semi-Gloss, Satin
2. Clear Finish: Polyurethane
 - a. 1st Coat: S-W Minwax Fast Drying Polyurethane Varnish
 - b. 2nd Coat: S-W Minwax Fast Drying Polyurethane Varnish
 - c. Sheen: Gloss, Semi-Gloss, Satin

4.04 INTERIOR COATING SYSTEMS - WOOD SURFACES

A. Opaque Finishes: Provide the following opaque paint finish systems over interior wood surfaces, if indicated in the drawings:

1. Waterbased/Alkyd Urethane System:
 - a. Gloss Finish:
 - 1) Primer: S-W Premium Wall & Wood Primer, B28W8111 Series
 - 2) Intermediate Coat: Pro Industrial Waterbased Alkyd Urethane Gloss, B53-1050 Series
 - 3) Top Coat: Pro Industrial Waterbased Alkyd Urethane Gloss, B53-1050 Series
 - b. Semi-Gloss Finish:
 - 1) Primer: S-W Premium Wall & Wood Primer, B28W8111 Series
 - 2) Intermediate Coat: Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series

- 3) Top Coat: Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series
 2. Latex System:
 - a. Gloss Finish:
 - 1) Primer: PrepRite® ProBlock® Latex Primer/Sealer, B51-620 Series
 - 2) Intermediate Coat: ProMar 200 Zero VOC Gloss, B21-12650 Series
 - 3) Top Coat: ProMar 200 Zero VOC Gloss, B21-12650 Series
 - b. Semi-Gloss Finish:
 - 1) Primer: PrepRite® ProBlock® Latex Primer/Sealer, B51-620 Series
 - 2) Intermediate Coat: ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
 - 3) Top Coat: ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
 3. Water-Based Light Industrial Coating System:
 - a. Semi-Gloss Finish:
 - 1) Primer: PrepRite® ProBlock® Latex Primer/Sealer, B51 Series
 - 2) Intermediate Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-151 Series
 - 3) Top Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-151 Series
- B. Clear Finishes:
 1. Polyurethane System
 - a. 1st Coat: S-W Minwax Fast Drying Polyurethane, Satin
 - b. 2nd Coat: S-W Minwax Fast Drying Polyurethane, Satin
 2. Alkyd System:
 - a. 1st Coat: S-W Minwax Performance Series Fast-Dry Sanding Sealer
 - b. 2nd Coat: S-W Minwax Performance Series Fast-Dry Oil Varnish, Satin
 - c. 3rd Coat: S-W Minwax Performance Series Fast-Dry Oil Varnish, Satin
- C. Semi-Transparent Finishes:
 1. Polyurethane (topcoat):
 - a. 1st Coat: S-W Minwax Performance Series Tintable Wood Stain 250
 - b. 2nd Coat: S-W Minwax Fast Drying Polyurethane Varnish, Satin
 - c. 3rd Coat: S-W Minwax Fast Drying Polyurethane Varnish, Satin
 2. Alkyd (topcoat):
 - a. 1st Coat: S-W Minwax Performance Series Tintable Wood Stain 250 VOC
 - b. 2nd Coat: S-W Minwax Performance Series Fast-Dry Sanding Sealer
 - c. 3rd Coat: S-W Minwax Performance Series Fast-Dry Oil Varnish, Satin
 - d. 4th Coat: S-W Minwax Performance Series Fast-Dry Oil Varnish, Satin

4.05 INTERIOR COATING SYSTEMS - METAL SURFACES

- A. Ferrous Metal: Includes, but not limited to, interior metal doors, door frames and miscellaneous metals, if indicated in the drawings:
 1. Latex System:
 - a. Semi-Gloss Finish:
 - 1) Primer: Pro Industrial™ Prep-Ritel® Bonding Primer, XXX Series (MPI #17)
 - (a) Shop Primed Surfaces: Except for "touch-up," prime coat may be omitted. Verify compatibility and application of finish coat over shop primer with paint manufacturer.
 - 2) Intermediate Coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series
 - 3) Top Coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series
- B. Non-Ferrous (Galvanized) Metal Substrates:
 1. Latex System:
 - a. Semi-Gloss Finish:
 - 1) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series

- (a) Shop Primed Surfaces: Except for "touch-up," prime coat may be omitted. Verify compatibility and application of finish coat over shop primer with paint manufacturer.
 - 2) Intermediate Coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series
 - 3) Top Coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series
 - 2. Epoxy-Modified Latex System:
 - a. Gloss Finish:
 - 1) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series
 - 2) Intermediate Coat: Pro Industrial™ Water Based Catalyzed Epoxy Gloss, B73-300 Series
 - 3) Top Coat: Pro Industrial™ Water Based Catalyzed Epoxy Gloss, B73-300 Series
 - 3. Pre-Catalyzed Waterbased Epoxy System:
 - a. Semi-Gloss Finish:
 - 1) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series
 - 2) Intermediate Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46 Series
 - 3) Top Coat: Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46 Series
- C. Ferrous and Non-Ferrous Metals at Exposed Ceiling Conditions:
 - 1. Exposed roof structure and overhead-mounted services in utilitarian spaces shall be painted, to include steel roof decking, bar joists, structural steel, metal fabrications, ductwork, conduit, piping, etc.
 - 2. Ferrous and Non-Ferrous Metals:
 - a. Latex Dryfall:
 - 1) Eg-Shel Finish:
 - (a) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series
 - (1) Shop Primed Surfaces: Except for "touch-up," prime coat may be omitted. Verify compatibility and application of finish coat over shop primer with paint manufacturer.
 - (b) Top Coat: Pro Industrial™ Waterborne Acrylic Dryfall Eg-Shel, XX Series, (MPI #155)
 - (c) 2nd coat (as required): Pro Industrial™ Waterborne Acrylic Dryfall Eg-Shel, XX Series (MPI #155)
 - 2) Flat Finish:
 - (a) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series
 - (1) Shop Primed Surfaces: Except for "touch-up," prime coat may be omitted. Verify compatibility and application of finish coat over shop primer with paint manufacturer.
 - (b) Top Coat: Pro Industrial™ Waterborne Acrylic Dryfall Flat, B42-80 Series, (MPI #118)
 - (c) 2nd coat (as required): Pro Industrial™ Waterborne Acrylic Dryfall Flat, B42-80 Series (MPI #118)

END OF SECTION

SECTION 10 21 23
CUBICLES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Cubicle curtains with surface-mounted overhead tracking system.
- B. Shower curtains and accessories

1.03 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications
- B. Section 06 10 00 - Rough Carpentry
- C. Section 09 51 00 - Acoustical Ceilings
- D. Section 10 28 00 - Washroom Accessories

1.04 SUBMITTALS

- A. Submit in conformance with the provisions of Section 013300 - Submittal Procedures
- B. Product Data: Provide data for curtain fabric, track and hardware.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples for Verification: Provide samples of the following:
 - 1. Curtain Fabric: 12-inch square swatch or larger sample as required to show complete pattern repeat, from dye lot used for the work, with specified treatments applied.
 - 2. Mesh Top: Not less than 4 inches square, demonstrating manufacture's standard hemming around mesh perimeter with matching fabric.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Limitations: Do not install cubicles until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where cubicles are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.06 WARRANTY

- A. Tracking System:
 - 1. The manufacturer shall warrant the product against material defects, or defects in manufacturing, for one (1) year from Date of Substantial Completion.
- B. Curtain:
 - 1. The manufacturer shall warrant the product against material defects, or defects in manufacturing, for five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cubicle Tracking Systems:
 - 1. Specified Manufacturer: InPro Corporation
 - 2. Other Acceptable Manufacturers: Equivalent products of the manufacturer's listed below will be acceptable.

- a. C/S General Cubicle
 - b. Marshal/McMurry
 - c. Imperial Fastener Company, Inc.
 - d. Standard Textile Company, Inc.
 - e. Tubular Specialties Manufacturing, Inc.
- B. Cubicle Curtains:
 - 1. Specified Manufacturer: Standard Textile
 - 2. Other Acceptable Manufacturers: None identified. No substitutions will be considered or accepted.
- C. Shower Curtains and Accessories:
 - 1. Specified Manufacturer: InPro Corporation
 - 2. Other Acceptable Manufacturers: Equivalent products of the manufacturer's listed below will be acceptable.
 - a. Construction Specialties (C/S)
 - b. Bobrick
 - c. Bradley

2.02 CUBICLE TRACKING SYSTEMS

- A. Cubicle Tracking System:
 - 1. Product: C/S; Model #6062N, or equivalent.
 - 2. Description: Surface-mounted track/s of heavy extruded aluminum, 1-3/8 inch by 3/4-inch, slotted to receive roller carriers, complete with accessories and components required for complete and secure installation.
 - a. Profile: Channel.
 - b. Mounting: Surface.
 - 3. Structural Performance: Capable of supporting vertical test load of 50 lbs (23 kg) without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 - 4. Track End Stop: To fit track section.
 - 5. Track Bends: Minimum 12 inch (300 mm) radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Finish on Exposed Surfaces: Clear anodized.
 - 7. Curtain Carriers: Model #1062N, virgin nylon axle with nylon wheels complete with nickel-plated brass bead-chain and hook assembly.
 - a. Provide one carrier for each 6-inches of cubicle curtain width.
 - 8. Wand: Plastic hollow section, attached to lead carrier, for pull-to-close action.
 - 9. Installation Accessories: Types required for specified mounting method and substrate conditions.
 - 10. Mounting:
 - a. Track shall be ceiling surface-mounted with #8 pan head screws or with toggle or molly bolts spaced no more than 30" apart.
 - b. Coordination: Comply with NFPA 13 requirements and coordinate installation of sprinkler heads with the cubicle curtain track.

2.03 CUBICLE CURTAIN

- A. Cubicle Curtain: Finish Type CC- #, as specified below:
- B. Type CC-1:
 - 1. Manufacturer: Standard Textile, no substitutions.
 - a. Contacts: P: 800-999-0400 / Web: www.standardtextile.com
 - 2. Product: #CM000603
 - 3. Pattern: Peonies
 - 4. Color: Pumpernickel.
 - 5. Width: 72-inches.
 - 6. Length: As indicated on Drawings.

7. Physical Properties:
 - a. Content: 100% Polyester
 - b. Characteristics: Antimicrobial, Flame-resistant, and sustainable.
 - c. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.
 - 1) Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.
8. Fire Performance:
 - a. Surface Burning Characteristics (ASTM E-84): Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - b. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
- C. Fabrication:
 1. Curtain Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12-inches (300 mm).
 2. Curtain Length: Equal to floor-to-ceiling height minus 2-inches from finished ceiling at top and 15-inches above finished floor at bottom.
 3. Mesh Top: Include open mesh cloth at top 20 inches (508 mm) of curtain for room air circulation, attached to curtain as specified above.
 4. Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches (150 mm) on center.
 5. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

2.04 SHOWER CURTAINS AND ACCESSORIES

- A. Shower Curtain: Finish Type SC- #, as specified below:
- B. Type SC-1:
 1. Product: Inpro; Clickeze ® Shower Curtain.
 2. Curtain Material: Heavy duty, 13 gauge, flame retardant, anti-microbial Super Bio Stat vinyl.
 - a. Polyester reinforced medical grade PVC, anti-static, antimicrobial, flame retardant, stain resistant, odor resistant, water repellent, wear resistant, scrubbable and colorfast.
 3. Pattern: As shown on the drawings.
 4. Color:
 5. Curtain Fabrication:
 - a. Curtain Width: Manufacture curtains of one piece, sized to 10% wider than the track length but no less than 1' (304.8mm) extra fullness. Width tolerance $\pm 3"$.
 - b. Curtain Height: 80 inches. Shower curtains hang 1/2" (12.7mm) above floor. Height tolerance $\pm 1/2"$.
 - c. Curtain Heading: Include 4-ounce (113.4g) nickel-plated grommets, 6" (152.4mm) on center for carriers. Top hem to be triple-turned hem over nylon tape for rugged wear.
 - d. Seams: Curtains are to be seamless when possible with sanitary "no scum" side and bottom edges. Sewing thread to be triple-ply twisted nylon.
- C. Shower Curtain Accessories:
 1. Curtain Hooks: Model #CE100800 Stainless Steel Slide Beads
 - a. Height: 2-1/2 inches.
 - b. Inside Diameter: 1-5/16 inches.
 2. Curtain Rod: Model #CE10075X:
 - a. Length: As shown on drawings.
 - b. Rod Construction: Type 304 Stainless Steel Tube, 1" (25.4mm) diameter x .035" (.89mm) wall thickness (20 gauge). Finish – BS, Bright Stainless.

- c. Flange Construction: .031" (.89mm) thick, type 304 stainless steel. Includes two 3/16" (4.8mm) diameter mounting holes with formed countersink for #10 Oval Head Screws (by others).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.

3.02 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Install end cap and stop device.
- C. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 26 00
INTERIOR WALL PROTECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Interior surface protection, including handrails, corner guards, and wall protection sheets.

1.03 RELATED SECTIONS

- Section 06 10 00 - Rough Carpentry
- Section 09 21 16 - Gypsum Board Assemblies

1.04 ACTION SUBMITTALS

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Shop drawings showing locations, extent and installation details of crash rails. Show methods of attachment to adjoining construction.
- C. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern and end cap attachment and alignment:
 - 1. 12-inch (304.8-mm) long sample of each model specified including end cap.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Certificates: For each impact-resistant plastic material, from manufacturer.
- C. Material Test Reports: For each impact-resistant plastic material.
- D. Warranty: Sample of special warranty.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's Qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated.
- D. Code compliance: Assemblies should conform to all applicable codes.
- E. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements.

1.09 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting installation of products.

1.10 WARRANTY

- A. Warranty: The manufacturer shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from Date of Substantial Completion.
- B. Special Warranty: Manufacturer shall warrant the products specified in this section against material defects or defects in manufacturing, for a period of five (5) years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturers: Construction Specialties, Inc. (C/S).
 - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 PERFORMANCE REQUIREMENTS

- A. Materials shall meet or exceed the following performance requirements:
 - 1. Surface Burning Characteristics: Provide Class A/1 assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 2. Fire Resistance: Where fire rating is specified for the wall in which the guard is mounted, provide assemblies that have been tested in accordance with ASTM E119 for the same rating as the wall.
 - 3. Structural:
 - a. Resist lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
 - b. Support vertical live load of 100 lb/lineal ft (1,400 N/m) with deflection not to exceed 1/50 of span between supports.
 - 4. Impact strength: Provide wall protection components that have been tested in accordance with the applicable provisions of ASTM F476.
 - 5. Chemical- and Stain-Resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.

2.03 MATERIALS

- A. Engineered PETG: Extruded material shall be high-impact Acrovyn 4000 with Shadowgrain texture, nominal .078-inch (1.98-mm) thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
- B. Regrind PETG: PVC-free regrind absorption cushion.
- C. Rigid Sheet Wall Covering: Engineered PETG. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Thickness as specified.
- D. Aluminum: Extruded aluminum should be 6063-T6 alloy, nominal .085-inch (2.16-mm) thickness. Minimum strength and durability properties as specified in ASTM B221.
- E. Stainless Steel: Type 304, No. 4 finish.
- F. Rubber: UV-resistant, black, uniform in color, smooth surface.

- G. Wood: Formed wood particle core with melamine wood grain finish.
- H. Adhesive: Per manufacturer requirements.
- I. Fasteners: All fasteners to be non-corrosive and compatible with aluminum components. All necessary fasteners to be supplied by the manufacturer.

2.04 INTERIOR SURFACE PROTECTION

- A. Corridor Handrails: Finish Type HR- #, as specified below:
 - 1. Type HR-1:
 - a. Product: C/S; Model No. HRB-20N.
 - 1) Description: Surface-mounted combination handrail / bumper guard assembly consisting of a continuous extruded aluminum retainer with snap-on cover and integral shock absorbing cushions.
 - (a) Handrail: Engineered PETG, including end caps and corners.
 - (b) Bumper Cushion: Regrind PETG.
 - (c) Hardware: Attachment hardware shall be appropriate for wall conditions.
 - (d) Retainer: Extruded aluminum.
 - b. Color & Texture: As scheduled on the Interior Finish Legend.
 - c. Height: 5-5/8 -inches (142.9-mm), with 1-1/2 inch (38.1-mm) oval grip.
 - d. Length: As indicated on drawings.
 - e. Mounting:
 - 1) Clear Space From Wall: 1-1/2 inch (38 mm).
 - 2) Projection From Wall to Outside of Rail: 3 inch (76 mm).
 - 3) Return rail to wall.
 - 4)
 - 5) Mounting Height: 36-inches to top of handrail from finished floor unless indicated otherwise.
 - 6) Comply with accessibility requirements of ICC A117.1 and ADA Standards.
- B. Corner Guards: Finish Type CG- #, as specified below:
 - 1. Type CG-1: NOT USED
 - 2. Type CG-2: NOT USED
 - 3. Type CG-3:
 - a. Product: C/S; Model No. SM-20AN-Acrovyn 4000, Surface-mounted corner guard.
 - b. Description: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware.
 - c. Configuration: 90-degree corner.
 - d. Retainers: Extruded aluminum; 6063-T6 alloy, nominal .062-inch (1.57mm) thickness per ASTM B221.
 - e. Cover: Acrovyn 4000, with preformed end caps.
 - 1) Material: Engineered PETG.
 - 2) Thickness: 0.078-inches (2.0-mm).
 - f. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
 - g. Width of Wings: 3 inches (76 mm).
 - h. Corner: Radiused 1/4-inch.
 - i. Color: #858 - Pumice.
 - j. Length: Full height of wall to ceiling, less height of wall base.
 - k. Installation: Mount to wall at top of wall base.
 - 4. Type CG-4:
 - a. Product: C/S; Model No. SSM-25AN-Acrovyn 4000, Surface-mounted corner guard.
 - b. Description: Assembly consisting of snap-on plastic cover installed over continuous retainer at each corner, with end of wall covered by semirigid, impact-resistant sheet wall covering; including mounting hardware.
 - c. Configuration: Endwall, 90-degree corners.
 - d. Retainers: Extruded aluminum.

- e. Cover: Acrovyn 4000, with preformed end caps.
 - 1) Material: Engineered PETG.
 - 2) Thickness: 0.078-inches (2.0-mm).
 - f. Endwall Cover: 0.040-inch Acrovyn sheet.
 - g. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
 - h. Width of Wings: 2 inches (51 mm).
 - i. Corner: Radiused 1/4-inch.
 - j. Color: #858 - Pumice.
 - k. Length: Full height of wall to ceiling, less height of wall base.
 - l. Installation: Mount to wall at top of wall base.
5. Type CG-5:
- a. Product: C/S; Model No. SM-20MN-Acrovyn 4000, Surface-mounted corner guard.
 - b. Description: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware.
 - c. Configuration: 135-degree corner.
 - d. Retainers: Extruded aluminum; 6063-T6 alloy, nominal .062-inch (1.57mm) thickness per ASTM B221.
 - e. Cover: Acrovyn 4000, with preformed end caps.
 - 1) Material: Engineered PETG.
 - 2) Thickness: 0.078-inches (2.0-mm).
 - f. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
 - g. Width of Wings: 3 inches (76 mm).
 - h. Corner: Radiused 1/4-inch.
 - i. Color: #858 - Pumice.
 - j. Length: Full height of wall to ceiling, less height of wall base.
 - k. Installation: Mount to wall at top of wall base.
6. Type CG-6:
- a. Product: C/S; Model No. CO-8.
 - 1) Description: Surface-mounted stainless steel corner guard.
 - b. Configuration: 90-degree corner.
 - c. Material: Stainless steel.
 - d. Width of Wings: 3-1/2 inches.
 - e. Corner: 3/16-inch (4.8-mm) radius.
 - f. Finish: Stainless Steel: No. 4 satin finish.
 - g. Attachment
 - 1) Adhesive: Field applied heavy duty adhesive
7. Type CG-7:
- a. Product: C/S; Model No. SM-20AN-Acrovyn 4000, Surface-mounted corner guard.
 - b. Description: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware.
 - c. Configuration: 90-degree corner.
 - d. Retainers: Extruded aluminum; 6063-T6 alloy, nominal .062-inch (1.57mm) thickness per ASTM B221.
 - e. Cover: Acrovyn 4000, with preformed end caps.
 - 1) Material: Engineered PETG.
 - 2) Thickness: 0.078-inches (2.0-mm).
 - f. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
 - g. Width of Wings: 3 inches (76 mm).
 - h. Corner: Radiused 1/4-inch.
 - i. Color: #378 - Brushed Nickel.
 - j. Length: Full height of wall to ceiling, less height of wall base.

- k. Installation: Mount to wall at top of wall base.
- C. Wall Protection Sheet: Finish Type WP- #, as specified below:
 - 1. Type WP-1:
 - a. Product: C/S; Acrovyn 4000 Sheet, High-impact wall covering.
 - 1) Material: Engineered PETG rigid sheet. Chemical and stain resistance shall comply with ASTM D543.
 - 2) Material Thickness: 0.040 inch, nominal.
 - b. Surface Texture: Suede.
 - c. Color: Chameleon Collection, #1350 - Sable Elm.
 - d. Sheet Size: Per manufacturer.
 - e. Materials:
 - 1) Engineered PETG, Extruded material shall be high-impact Acrovyn 4000. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
 - 2) Adhesive: Acrovyn Wall Panels shall be furnished as a complete packaged system, including appropriate standard adhesive.
 - f. Accessories;
 - 1) Trim and Joint Moldings: Extruded rigid plastic that matched sheet wall covering.
 - 2) Adhesive: Per manufacturer.
 - g. Mounting: Adhesive.
 - 2. Type WP-1:
 - a. Product: C/S; Acrovyn 4000 Sheet, High-impact wall covering.
 - 1) Material: Engineered PETG rigid sheet. Chemical and stain resistance shall comply with ASTM D543.
 - 2) Material Thickness: 0.040 inch, nominal.
 - b. Surface Texture: Suede.
 - c. Color: #858 - Pumice.
 - d. Sheet Size: Per manufacturer.
 - e. Materials:
 - 1) Engineered PETG, Extruded material shall be high-impact Acrovyn 4000. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
 - 2) Adhesive: Acrovyn Wall Panels shall be furnished as a complete packaged system, including appropriate standard adhesive.
 - f. Accessories;
 - 1) Trim and Joint Moldings: Extruded rigid plastic that matched sheet wall covering.
 - 2) Adhesive: Per manufacturer.
 - g. Mounting: Adhesive.
- D. Type WP-3:
 - 1. Product: C/S; Acrovyn 4000 Sheet, High-impact wall covering.
 - a. Material: Engineered PETG rigid sheet. Chemical and stain resistance shall comply with ASTM D543.
 - b. Material Thickness: 0.040 inch, nominal.
 - 2. Surface Texture: Suede.
 - 3. Color: #378 - Brushed Nickel.
 - 4. Sheet Size: Per manufacturer.
 - 5. Materials:
 - a. Engineered PETG, Extruded material shall be high-impact Acrovyn 4000. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
 - b. Adhesive: Acrovyn Wall Panels shall be furnished as a complete packaged system, including appropriate standard adhesive.

6. Accessories;
 - a. Trim and Joint Moldings: Extruded rigid plastic that matched sheet wall covering.
 - b. Adhesive: Per manufacturer.
7. Mounting: Adhesive.
- E. Type WP-4:
 1. Product: C/S; Acrovyn 4000 Sheet, High-impact wall covering.
 - a. Material: Engineered PETG rigid sheet. Chemical and stain resistance shall comply with ASTM D543.
 - b. Material Thickness: 0.060 inch, nominal.
 2. Surface Texture: Suede.
 3. Color: #858 - Pumice.
 4. Sheet Size: Per manufacturer.
 5. Materials:
 - a. Engineered PETG, Extruded material shall be high-impact Acrovyn 4000. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
 - b. Adhesive: Acrovyn Wall Panels shall be furnished as a complete packaged system, including appropriate standard adhesive.
 6. Accessories;
 - a. Trim and Joint Moldings: Extruded rigid plastic that matched sheet wall covering.
 - b. Adhesive: Per manufacturer.
 7. Mounting: Adhesive.

2.05 FABRICATION

- A. General: Fabricate wall covering to comply with requirements indicated for design, dimensions, detail, finish and sizes.
- B. Fabricate components with tight joints, corners and seams.
- C. Pre-drill holes for attachment.
- D. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on Drawings.

3.02 PREPARATION

- A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.

3.03 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guards at the top of the wall base.

3.04 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch (6 mm).
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch (6 mm).

END OF SECTION

SECTION 10 28 00
WASHROOM ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Private-use washroom accessories.
- B. Custodial accessories.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies
- C. Section 09 30 00 - Tiling

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
- B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify products using designations indicated.

1.05 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.06 CLOSEOUT SUBMITTALS

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

1.07 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

1.08 COORDINATION

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

1.09 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specified Manufacturer: Bobrick Washroom Equipment, Inc.
- B. Other Acceptable Manufacturer's: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. American Specialties, Inc.
 - 2. Bradley Corporation.
 - 3. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - 4. Innotech Products Inc.

2.02 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.03 WASHROOM ACCESSORIES

- A. Washroom Accessories: Accessory Type A- #, as specified below.
- B. Accessory Type A5109: Grab Bar (CFCI)
 - 1. Contractor Furnished / Contractor Installed
 - 2. Product: Bobrick B-6806.99
 - 3. Mounting: Flanges with concealed fasteners
 - 4. Material: Stainless steel, 0.05 inch (1.3 mm) thick
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area
 - 5. Outside Diameter: 1-1/2 inches (38 mm)
 - 6. Configuration and Length: As indicated on Drawings, in straight, bent and fold up styles
 - a. A5109a: Horizontal, 36-inches
 - b. A5109b: Horizontal, 42-inches
 - c. A5109c: Vertical, 18-inches
- C. Accessory Type A1066: Framed Mirror (CFCI)
 - 1. Contractor Furnished / Contractor Installed
 - 2. Product: Bobrick B-290 Series
 - a. Mirror: No. 1 quality, 1/4-inch (6-mm) select float glass
 - b. Frame: Stainless-steel angle, 3/4-inch x 3/4-inch (19 x 19-mm)
 - 1) Corners: Welded, ground smooth, and polished out to match #4 finish
 - c. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below
 - 1) One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts
 - 2) Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove

3. Size: As indicated on Drawings
- D. Accessory Type A1090: Framed Mirror with Shelf (CFCI)
 1. Contractor Furnished / Contractor Installed
 2. Product: Bradley B-292 Series
 - a. Mirror: No. 1 quality, 1/4-inch (6-mm) select float glass
 - b. Frame: Stainless-steel angle, 3/4-inch x 3/4-inch (19 x 19-mm)
 - 1) Corners: Welded, ground smooth, and polished out to match #4 finish
 3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts
 - b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove
 4. Shelf: Shall be type 304, 18-gauge (0.8-mm) stainless steel with satin finish; A 3/4-inch (19-mm) return edge on front; Front and side return edges hemmed and corners welded, ground, and polished smooth. Shelf shall be welded to mirror frame.
 5. Size: As indicated on Drawings
- E. Accessory Type A5075: Soap Dispenser (OFCI)
 1. Owner Furnished / Contractor Installed
 2. Product: Coordinate with Owner
- F. Accessory Type A5077: Hand Sanitizer (OFOI)
 1. Owner Furnished / Owner Installed
 2. Product: Coordinate with Owner
- G. Accessory Type A5080: Paper Towel Dispenser (OFCI)
 1. Owner Furnished / Contractor Installed
 2. Product: Coordinate with Owner
- H. Accessory Type A5196: Toilet Tissue Dispenser - Recessed (CFCI)
 1. Contractor Furnished / Contractor Installed
 2. Product: Bobrick B-3888, Recessed Multi-Roll Toilet Tissue Dispenser
 - a. Recessed multi-roll toilet tissue dispenser shall be type-304 stainless steel with welded construction, including dispensing mechanism, inner housing and cam; exposed surfaces shall have satin finish.
 - b. Unit shall dispense two standard-core toilet tissue rolls up to 5-1/4 inch (133-mm) diameter (1800 sheets). Extra roll shall automatically drop in place when bottom roll is depleted.
 - c. Unit shall be equipped with two heavy-duty, one-piece, molded ABS theft-resistant spindles.
 3. Mounting Height: 28-inches (710-mm) above finished floor to top of unit.
- I. Accessory Type A5082: Automatic Paper Towel Dispenser (OFCI)
 1. Owner Furnished / Contractor Installed
 2. Product: Coordinate with Owner
- J. Accessory Type A5135: Utility Shelf with Mop/Broom Holders (CFCI)
 1. Contractor Furnished / Contractor Installed
 2. Product: Bobrick; Model B-239, Utility Shelf with Mop / Broom Holders and Rag Hooks.

- a. Description: Utility shelf shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Shelf shall be 18 gauge (1.2mm), 8-inches (205mm) deep with 3/4-inch (19mm) return edges
 - 1) Mop/Broom Holders: Spring-loaded rubber cams with anti-slip coating. Plated steel retainers. Three (3) required.
 - 2) Hooks: 18-8, type-304, 12-gauge (2.8mm) stainless steel with satin finish. Each hook attached to mounting strip with two rivets. Four (4) required.
- 3. Length: 34-inches (865 mm) .
- 4. Mounting Height: 72-inches above finished floor to top of shelf.

- K. Accessory Type ____: Shower Curtains and Accessories (CFCI)
 - 1. Contractor Furnished / Contractor Installed
 - 2. Refer to Section 10 21 23 for requirements

- L. Accessory Type A5180: Cubicle Curtain and Track (CFCI)
 - 1. Contractor Furnished / Contractor Installed
 - 2. Product: Refer to Section 10 21 23 for requirements

- M. Accessory Type A5180: Cubicle Curtain and Track (CFCI)
 - 1. Contractor Furnished / Contractor Installed
 - 2. Product: Refer to Section 10 21 23 for requirements

- N. Accessory Type A5106: Sharps Container (OFCI)
 - 1. Owner Furnished / Contractor Installed
 - 2. Product: Coordinate with Owner

- O. Accessory Type A5107: Glove Dispenser (OFCI)
 - 1. Owner Furnished / Contractor Installed
 - 2. Product: Coordinate with Owner

2.04 FABRICATION

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

PART 3 EXECUTION

3.01 INSTALLATION

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

3.02 ADJUSTING AND CLEANING

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

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Portable fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies

1.04 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.07 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Provide fire protection specialties produced by a single manufacturer.
- C. Provide fire extinguishers of type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.

1.08 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.09 WARRANTY

- A. Fire Extinguishers: The manufacturer shall warrant the product/s to be free of defects in material and workmanship under conditions of normal use for a period of six (6) years from Date of Substantial Completion.

- B. All Fire Protection Products (except fire extinguishers) carry a one year warranty from the Date of Substantial Completion against defects in materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer/s:
 - 1. Fire Extinguishers: J.L. Industries.
 - 2. Fire Extinguisher Cabinets: Larsen's Manufacturing Company.
- B. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be acceptable.
 - 1. Kidde (United Technologies).
 - 2. Ansul (Tyco).
 - 3. Nystrom, Inc.
 - 4. Potter-Roemer.
 - 5. Pyro-Chem (Tyco).
 - 6. Fire End & Croker Corporation

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Fire Extinguisher, Type A:
 - 1. Multi-Purpose Chemical Type: Extinguisher unit containing a fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic.
 - 2. Product: JLI; Cosmic Series, Model 10E
 - a. Nominal Capacity: 10 pound (4.54 kg)
 - b. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin and upright squeeze grip.
 - c. Finish: Factory powder-coated; Red.
 - d. Effectiveness (Rating): Class A, B, and C fires.
 - e. UL Rating: 4A-80B:C.
 - f. Size: 5-inch diameter / 21-inches high.
- C. Fire Extinguisher, Type K:
 - 1. Class K Wet Chemical Type: Extinguisher unit containing a low "pH" potassium acetate solution.
 - 2. Product: JLI; Saturn Series, Model 15.
 - a. Size: 1.8 gallons (6.8 L).
 - b. Construction: Stainless steel cylinder with protective nozzle tip orifice seal and nonmetallic nozzle tip finger guard, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin, and upright squeeze grip.
 - c. Effectiveness (Rating): Class A, K fires.
 - d. UL Rating: (C)1-A:K.
 - e. Size: 7-inch diameter / 19-1/4 inches overall height.

2.03 FIRE PROTECTION CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
 - 1. Non-Fire-Rated:
 - a. Formed primed steel sheet; 0.036 inch (0.9 mm) thick base metal.
 - 2. Fire Rated Cabinet Construction: One-hour fire rated.
 - a. Steel; double wall or outer and inner boxes with 5/8 inch (15.9 mm) thick fire barrier material.
- C. Cabinet Configuration: Semi-recessed type.

1. Trim: Flat square edge, with ____ inch (____ mm) wide face.

2.04 SEMI-RECESSED FIRE PROTECTION CABINETS

A. General Specifications:

1. Cabinet Configuration: Semi-recessed type.
 - a. Sized to accommodate accessories.
 - b. Interior Dimensions of Cabinets: 9-1/2 inches wide by 24-inches high by 6-inches deep, typical unless noted otherwise.
 - c. Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
 - d. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
2. Cabinet Box:
 - a. Non-Fire-Rated Cabinets:
 - 1) Formed 0.036 inch (0.9 mm) thick steel sheet with white baked enamel finish.
 - b. Fire-Rated Cabinets:
 - 1) Construction: Shall have double wall of formed 0.036 inch (0.9 mm) thick steel sheet with white baked enamel finish. The space between the double walls shall be lined with 5/8 inch (15.9 mm) thick fire barrier material.
 - 2) Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
3. Cabinet Exterior Trim and Door:
 - a. Material: Baked enamel, White color.
 - b. Door Style: Horizontal Duo.
 - c. Door Glazing:
 - 1) Tempered glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.
 - d. Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
 - 1) Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
 - 2) Fabricate door frames of one-piece construction with edges flanged.
 - 3) Miter and weld perimeter door frames.
4. Door Hardware:
 - a. Catch: Self-adjusting roller catch.
 - b. Hinge: Continuous piano hinge capable of opening 180-degrees.
 - c. Door Pull: Satin finish pull handle.
5. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

B. Non-Rated Semi-Recessed Cabinet, Type FEC-A:

1. Product: Larsen's; "Architectural Series", Model No. 2409-6R.
2. For installation in non-rated wall construction.
3. Fire Extinguisher: Provide one (1) fire extinguisher, Type A per cabinet
4. Cabinet trim projection from wall: 2-1/2 inches, rolled edge.
5. Rough Opening Depth: 4-inches, minimum. Coordinate with wall construction for proper clearance.

C. Semi-Recessed Cabinet, Type FEC-K, Non-Rated:

1. Product: Larsen's; "Architectural Series", Model No. 2712-RL.
2. For installation in non-rated wall construction.
3. Fire Extinguisher: Provide one (1) fire extinguisher, Type K.
4. Cabinet Trim Projection from Wall: 2-1/2 inches, rolled edge.
5. Interior Dimensions of Cabinet: 12-inches wide by 27-inches high by 8-inches deep.
6. Rough Opening Depth: 6-inches deep (min). Coordinate with wall construction for proper clearance.

D. One-Hour Fire-Rated Semi-Recessed Cabinet, Type FEC-1A:

1. Larsen's; "Architectural Series", Model No. FS-2409-R4.
 2. For installation in 1-hour fire-rated wall construction.
 3. Fire Extinguisher: Provide one (1) fire extinguisher, Type A.
 4. Cabinet trim projection from wall: 3-1/2 inches, square edge.
 5. Rough Opening Depth: 4-inches, minimum. Coordinate with wall construction for proper clearance.
- E. Two-Hour Fire-Rated Semi-Recessed Cabinet, Type FEC-2A:
1. Larsen's; "Architectural Series", Model No. FS-2409-6R.
 2. For installation in 2-hour fire-rated wall construction.
 3. Fire Extinguisher: Provide one (1) fire extinguisher, Type A.
 4. Cabinet Trim Projection from Wall: 2-1/2 inches, square edge.
 5. Rough Opening Depth: 4-7/8 inches, minimum. Coordinate with wall construction for proper clearance.

2.05 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.
 2. Provide inside latch and lock for break-glass panels.
 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
- C. Place extinguishers in cabinets.

3.03 FIELD QUALITY CONTROL

- A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

END OF SECTION

SECTION 12 32 16

MANUFACTURED PLASTIC LAMINATE FACED CASEWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract (including General Conditions, Supplementary General Conditions, and Division 1 Specification Sections) shall apply to this Section.

1.02 SECTION INCLUDES

- A. Fixed modular plastic laminate clad casework and components.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 06 61 16 - Solid Surface Fabrications
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Section 09 65 13 - Resilient Base and Accessories
- E. Section 12 36 61 - Quartz Surfacing Fabrications
- F. Division 22 - Plumbing
- G. Division 26 - Electrical

1.04 REFERENCES

- A. AWI Section 400 (Architectural Cabinets)

1.05 DEFINITIONS

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.
- B. Manufactured Plastic Laminate Faced Casework (from here on referred to as "Casework") shall refer to laminated plastic casework, cabinets, shelving, counter, counters, related hardware and items indicated on the Drawings and specified.
- C. NEMA LD3 - High Pressure Decorative Laminates (HPDL) Grades:
 - 1. Grade HGS (GP 50): Horizontal grade
 - 2. Grade VGS (GP-28): Vertical Grade
 - 3. Grade CLS (CL 20): Cabinet liner
 - 4. Grade BKL (BK 20): Backing sheet
- D. TFM: Thermally Fused Melamine-Clad Particleboard.
- E. LPDL: Low-Pressure Decorative Laminate.
- F. MDF: Medium Density Fiberboard.
- G. MR MDF: Moisture-Resistant MDF.

1.06 COORDINATION

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

1.07 QUALITY ASSURANCE

- A. Manufacturer: Minimum of 5 years experience in providing manufactured casework systems for similar types of projects, produce evidence of financial stability, bonding capacity, and adequate facilities and personnel required to perform on this project.
- B. Manufacturer: Provide products certified as meeting or exceeding ANSI-A 161.1-2000 testing standards.
- C. Single Source Manufacturer: Casework, countertops and architectural millwork products must all be engineered and built by a single source manufacturer in order to ensure consistency and

quality for these related products. Splitting casework, countertops and/or architectural millwork between multiple manufacturers will not be permitted.

- D. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- E. Quality Standard: AWI standards are used to establish the minimum standard for casework construction to be provided on the project. AWI Section 400 (Architectural Cabinets) shall apply unless the Contract Documents specifies otherwise.
 - 1. Provide labels and certificates from AWI certification program indicating that casework, including installation, complies with requirements of grades specified.
 - 2. The following specifications are based on laminated plastic casework which shall be "Premium" grade as indicated and defined by the American Woodworking Institute (AWI).

1.08 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop drawings: Include plans, elevations, sections, details, and attachments to other work. Approved shop drawings and field verifications shall be obtained prior to fabrication.
- C. Keying Schedule: Include keying chart indicating whether cabinets, by room, are keyed alike or keyed differently and the quantity of master keys required.
- D. Samples for Verification: For the following:
 - 1. Laminate for each pattern selected.
 - 2. PVC edging for each pattern selected.
 - 3. Thermally fused melamine for each pattern selected.
 - 4. Hardware for each finish selected.
 - 5. Cabinet Sample: Submit full size, production type sample of a plastic laminate base cabinet showing complete construction details in accordance with the Contract Documents. Sample shall include one drawer, one shelf, service fittings, cabinet hardware, and a countertop.
 - a. Sample shall be delivered within 30 calendar days from contract date, at no cost to the Architect or Owner. Miniature "show room" type samples are not acceptable.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet minimum requirements for building conditioning for installation of finishes.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.11 WARRANTY

- A. Special Warranty: Manufacturer shall warrant the products specified in this section against material defects or defects in manufacturing, for a period of two (2) years from Date of Substantial Completion.
- B. Installation Warranty: The Contractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from Date of Substantial Completion.

1. Submit a written warranty to the Owner, executed by the Contractor, subcontractor, and the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specified Manufacturer: Advanced Cabinet Systems (ACS)
- B. Other Acceptable Manufacturer: Equivalent products of the manufacturer's listed below will be accepted. Additional manufacturers will be considered in accordance with the "or equal" provision specified in Section 01 60 00 - Product Requirements.
 1. Miller Manufacturing Cabinet & Fixture, Inc
 2. Royal Fixture Company
 3. Precision Millwork
 4. Fabricor, Inc
 5. Creative Associates
 6. Stevens Industries
 7. LSI Corporation
 8. Case Systems
 9. TMI Systems Corporation
 10. FADCO
- C. Substitutions: Submit a request for substitution for any manufacturer not named, as specified in Division 1.

2.02 CASEWORK - GENERAL

- A. Quality Standard: Architectural Woodwork Standards (AWS).
- B. Grade: Premium.
- C. AWI Type of Cabinet Construction: Flush overlay (concealed hinges).
- D. Cabinet Grain Direction for Wood Grain Plastic Laminate:
 1. Vertical on door and drawer fronts with continuous vertical matching.
 2. Vertical on end panels.
 3. Side-to-side on bottoms and tops of units.
 4. Vertical on knee-space panels.
 5. Horizontal on aprons.

2.03 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for Premium type of woodwork and quality grade specified, unless otherwise indicated.
- B. Lumber shall be in accordance with the AWS Grade specified for the product being fabricated. Moisture content shall be 6% to 12% for boards up to 2-inches nominal thickness, and shall not exceed 19% for thicker pieces.
- C. Particle Board: ANSI A208.1, Mat-Formed Particle Board, Grade M-2, made with binder containing no urea formaldehyde.
 1. Density: 45-pound, minimum.
- D. Hardboard: ANSI A135.4, Class 1, Tempered.
- E. Decorative Laminates: Shall be High Pressure Decorative Laminate (HPDL):
 1. Compliance: NEMA LD 3, and ANSI A161.2.
 2. Grades:
 - a. VGS: Vertical Grade, 0.028-inches thick.
 - b. HGS: Horizontal Grade, 0.048-inches thick.
 - c. HGP: Horizontal Grade, Post-formed, 0.039-inches thick.
 - d. VGP: Vertical Grade, Post-Formed, 0.028-inches thick.
 - e. HGF: Horizontal application, fire retardant material.
 - f. VGF: Vertical application, fire retardant material.

- g. CLS: Cabinet Liner, 0.020-inches thick.
 - h. BKH: Backer, 0.020-inches thick.:
 - i. TFM: Thermally Fused Melamine Laminate Panels: NEMA LD 3, Grade VGL, 100 grams. Finish shall be resistant to water and mild cleaners.
- F. Medium Density Fiberboard (MDF):
 - 1. Compliance: ANSI A208.2, Grade 130.
- G. Moisture-Resistant MDF (MR-MDF): Where countertops receive sinks, lavatories, or are subjected to liquids:
 - 1. Product: "Medex", as manufactured by Roseburg Forest Products Company.
 - a. Compliance: ANSI A208.2 - Grade 155; MR50.
 - b. Density: 48 pcf, minimum.
- H. Edgebanding: Refer to "Edgebanding" Article this Section.
- I. Glass for Glazed Doors:
 - 1. Standard Glazing: Clear tempered glass complying with ASTM C1048, Kind FT; not less than 1/4-inch thickness.
 - 2. Optional Glazing: Clear laminated tempered glass complying with ASTM C1172, Kind LT; not less than 5/16-inch thickness.
- J. Adhesives: Chemical-resistant waterproof adhesive as recommended by manufacturer of materials being joined.
 - 1. Do not use adhesives that contain urea formaldehyde.
- K. Joint Sealant: Mildew-resistant silicone sealant.
- L. Solid Surfacing: Refer to Section 06 61 16.
- M. Quartz Surfacing: Refer to Section 12 36 61.

2.04 SURFACES

- A. Exterior Surfaces of Cabinets:
 - 1. Door and Drawer Fronts: HPDL, Grade VGS. Provide balanced backing sheet (BKH) on all door and drawer fronts.
 - 2. Cabinet Sides: HPDL, Grade VGS.
 - 3. Wall Cabinets - Bottoms:
 - a. 48-inches or more above finished floor: HPDL, Grade VGS.
 - b. Less tha 48-inches above finished floor: HPDL , Grade HGS.
 - 4. Wall Cabinets, Tall Cabinets, and Hutches - Tops:
 - a. 80-inches or taller, and not visible from above: HPDL, Grade VGS.
 - b. Less than 80-inches tall, or visible from above: HPDL, Grade HGS.
 - 5. Edges: Refer to "Edgebanding" Article this Section.
- B. Interior Surfaces of Cabinets - Exposed (open interiors):
 - 1. Application: Any open storage unit without solid door or drawer fronts, units with glass or acrylic inserts in doors, and units with sliding doors.
 - 2. Open Cabinet Interior (Top, bottom, back sides, horizontal and vertical members): HPDL, Grade VGS.
 - 3. Open Cabinet Shelving: HPDL, Grade VGS.
 - 4. Edges: Refer to "Edgebanding" Article this Section.
- C. Interior Surfaces of Cabinets - Semi-Exposed (closed interiors):
 - 1. Application: Surfaces behind opaque doors and drawers.
 - 2. Door and Drawer Fronts: HPDL, Grade VGS.
 - 3. Cabinet Interior: Top, bottom, back, sides, horizontal and vertical members: HPDL, Grade TFM; Color shall be White.
 - 4. Closed Cabinet Shelving: HPDL, Grade VGS.
 - 5. Edges: Refer to "Edgebanding" Article this Section.
- D. Concealed Surfaces of Cabinets:

1. Surfaces that are not visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets; HPDL, Grade TFM, CLS, or BKH at Manufacturer's Option.
- E. Toekicks: Resilient base (by others).
- F. Wall Shelving on Standards and Brackets: HPDL, Grade HGS.
 1. Edges: Refer to "Edgebanding" Article this Section.
- G. Drawer Boxes: Clear Finish or Metabox (Contractor Option).

2.05 EDGEBANDING

- A. Edgebanding: Finish Type EB- #, as specified below.
- B. Type EB-1:
 1. Manufacturer: Doellken
 2. Product: # 8707E5
 - a. Material: Rigid PVC extrusion; through color with satin finish.
 - b. Color: Walnut Heights
 3. Edgebanding Thickness:
 - a. Cabinet Box Edges: 1-mm PVC
 - b. Door and Drawer Fronts: 3-mm PVC
 - c. Adjustable Shelves - Closed Cabinets Interiors: 3-mm PVC, front edge only
 - d. Adjustable Shelves - Open Cabinet Interiors: 3-mm PVC, front edge only
 - e. Tops of Wall Cabinets, Tall Cabinets, and Hutches: 1-mm PVC
 - f. Utility Shelving - Standards & Brackets: 3-mm PVC, all four edges
 - g. Countertops and Splashes: 3-mm PVC

2.06 FABRICATION - CABINETS

- A. Cabinet Body Construction:
 1. General: Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.
 2. Tops, Bottoms and Side Panels:
 - a. Core Material (Typical): 3/4-inch thick particleboard core with HPDL or TFM finish depending on the exposure.
 - 1) Exception: Sink Cabinets: Core shall be 3/4-inch thick Moisture-Resistant MDF (MR-MDF) with HPDL or TFM finish depending on the exposure.
 - b. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
 - c. Edgebanding: Refer to "Edgebanding" Article this Section.
 3. Back Panels:
 - a. Closed Cabinets: 1/2-inch thick particleboard core with HPDL or TFM finish depending on the exposure.
 - 1) Core Material (Typical): 1/2-inch thick particleboard core with TFM finish.
 - (a) Exception: Sink Cabinet shall be 1/2-inch thick Moisture-Resistant MDF (MR-MDF) with TFM finish depending on the exposure.
 - 2) Back shall be dadoed into sides, bottoms, and tops of closed cabinets.
 - b. Open Cabinets: 3/4-inch thick particleboard core with HPDL finish.
 - 1) Back shall be dowelled into sides, bottoms, and tops of open cabinets.
 4. Cabinet Bases:
 - a. Material: 3/4-inch, 45 pound density particle board.
 - b. Height: 4-inches, unless noted otherwise.
 - c. Base Options:
 - 1) Individual factory-applied base.
 - 2) Separate Cabinet Bases (Contractor Option): Bases to be continuous per elevation with cross members on 16-inch centers.
 5. Base units, except sink base units: Full sub-top glued and doweled to cabinet sides.

- a. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
- B. Adjustable Shelves in Cabinets:
 - 1. All shelving shall be 1-inch thick particleboard core with HPDL finish.
 - 2. All shelving shall be fully adjustable on 2-inch centers, with 5mm diameter holes.
 - 3. Edgebanding: Refer to "Edgebanding" Article this Section.
- C. Door and Drawer Fronts:
 - 1. 3/4-inch particleboard core with HPDL finish.
 - a. Sink Cabinets: Core shall be Moisture-Resistant MDF (MR-MDF) with HPDL finish.
 - 2. Edgebanding: Refer to "Edgebanding" Article this Section.
- D. Drawer Bodies:
 - 1. Hardwood drawer bodies:
 - a. Drawer sides and back shall be 1/2-inch thick hardwood, fully dovetailed front, back and sides, with 1/4-inch thick tempered masonite bottoms.
 - b. Drawer bottom shall be 1/4-inch thick hardwood plywood.
 - c. Drawer Configuration: Standard drawer.
 - d. Drawer Slide Operation: Full extension (KV8400).
 - e. File Drawer Slides: Full extension (KV8505).
 - f. Drawer Box Length: 21-5/8 inches unless otherwise indicated.
- E. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.

2.07 JOINERY OF CASE BODY MEMBERS

- A. Tops, exposed ends and bottoms:
 - 1. Stop dado, glued with pressure, and either nailed, stapled or screwed (fasteners will not be visible on exposed parts), or
 - 2. Doweled, glued with pressure; approx. 4 per foot, or
 - 3. European assembly screws:
 - a. Fasteners are to be used no more than 37mm from each end, with subsequent screws no more than 128-mm on-center.
 - b. Screw heads and/or plastic trim caps shall not be visible on exposed parts.
 - c. Glue is not required with this system.
- B. Cabinet Backs - Wall-Mounted:
 - 1. Captured in grooves on cabinets sides and bottom; securely fastened.
- C. Cabinet backs - Floor-Standing:
 - 1. Side bound, captured in grooves; securely fastened to top and bottom.

2.08 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Section 08 71 00 - Door Hardware (Scheduled by Describing Products).
- B. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Subparagraphs below are examples only. Revise to suit Project. If more than one finish is required, indicate location of each here or on Drawings. See Evaluations.
 - 2. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 - 3. Satin Stainless Steel: BHMA 630.
- C. Concealed Hardware Finishes: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- D. Hinges:
 - 1. Frameless Concealed Hinges (European Type): BHMA A156.9, Type B01602, 170-degrees of opening, self-closing.

- E. Drawer and Door Pulls:
 - 1. Back-Mounted Pulls: BHMA A156.9, B02011.
 - 2. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.
 - 3. General:
 - a. Provide two pulls for drawers more than 27-inches wide.
 - b. Provide 1-inch long mounting screws.
- F. Door and Drawer Catches: Magnetic catches, BHMA A156.9, B03141.
- G. Shelf Supports:
 - 1. Adjustable Shelf Standards and Supports: Two-pin locking plastic shelf rests complying with BHMA A156.9, Type B04012; with shelf brackets, B04112.
- H. Shelf Rests: BHMA A156.9, B04013; metal.
- I. Drawer Slides: BHMA A156.9, B05091.
 - 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
 - 2. Grades in five subparagraphs below correspond to the following initial load test requirements: Grade 2: 30 lbf (13.3 kg); Grade 1: 50 lbf (22.2 kg); Grade 1HD-100: 100 lbf (44.5 kg); Grade 1HD-200: 200 lbf (90 kg).
 - 3. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
 - 4. File Drawer Slides: Grade 1HD-200; for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
 - 5. Soiled Linen Slides: Grade 1HD-200; for trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.
- J. Door and Drawer Locks:
 - 1. Door Locks: Codelocks, Model #KL1000
 - 2. Drawer Locks: Codelocks, Model #KL1000
 - 3. Lock Locations:
 - a. Provide locks on ALL tall storage cabinets and wardrobe cabinets, even if not shown on drawings.
 - b. Provide locks on ALL file drawers.
 - c. Provide locks on base cabinet doors and drawers as shown on drawings.
 - d. Provide locks on wall cabinet doors as shown on drawings.
 - e. Lock Keying:
 - 1) Locks shall be capable of being keyed alike, keyed different and/or master keyed as directed by Owner.
 - 2) Provide 2 keys per lock and 10 master keys.
- K. Coat Rods: 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.
- L. Mirrors: 1/8 inch thick mirrored acrylic, break and impact resistant.
- M. Grommets for Cable Passage through Countertops: 2-1/2 inch OD, color as selected by Architect, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Product: Subject to compliance with requirements, provide "EDP series" by Doug Mockett & Company, Inc.
- N. Trash Ring: 8 or 12 inches (305 mm) dia cut out by 3/4 inches wide surface trim by 1 inch (25 mm) deep; satin stainless steel.
 - 1. In subparagraph below, "Model CP-2" is 12-inch (305-mm) slot; "Model CP-1" is 17-inch (432-mm) slot.
 - 2. Product: Subject to compliance with requirements, provide "Model TM12-SSS" by Doug Mockett & Company, Inc.

2.09 PLASTIC LAMINATE COUNTERTOPS

- A. Grade: Premium
- B. High-Pressure Decorative Laminate Grade: HGS
- C. Grain Direction: Parallel to cabinet fronts.
- D. Edge Treatment: Solid Surface Bullnose.
- E. Core Material: Particleboard or MDF, 1-1/8 inch thickness.
- F. Core Material at Wet Locations: Moisture-Resistant MDF (MR-MDF) at sink and lavatory locations, or where subjected to liquids, 1-1/8 inch thickness.
- G. Backer Sheet: Provide plastic laminate backer sheet, Grade BKH, on underside of countertop substrate.
- H. Cleats: 3/4-inch (19-mm), Grade TFM.
- I. Countertop Configuration and Sizes:
 - 1. Thickness: 1 1/4-inches.
 - 2. Depth:
 - a. Base Cabinet Locations: 23-1/2 inches, unless otherwise indicated.
 - b. Work Counter Locations: 16-7/8 inches, unless otherwise indicated.
 - c. Nurse Station Work Counters: 24-inches, unless otherwise indicated.
 - 3. Length and Layout: As indicated on drawings.
- J. Exposed Edge Treatment:
 - 1. Square, Self-Edge: Substrate built up to 1 1/4-inches thick; exposed faces covered with edgebanding. Refer to "Edgebanding" Article this Section.
 - a. Application of self-edge: Edge laminated before top.
- K. Back and End Splashes: Same material, same construction.
 - 1. All other Countertops: Back and End Splashes shall be 3/4-inches thick and attached by means of screws from underside of deck through continuous bead of silicone sealant.
 - a. Exposed edges and ends of backsplash shall be covered with edgebanding. Refer to "Edgebanding" Article this Section.
 - 2. Backsplashes in wet areas shall be moisture-resistant MDF (Medex) with high-pressure laminate bonded to all faces, including BKL on the back.
- L. Countertop Accessories:
 - 1. Wall-Mounted Countertop Support Brackets: Provide metal wall bracket, 1/8-inch thick, with black powder coat finish for support of countertops as shown on the Drawings.
 - a. Basis of Design Manufacturer: A&M Hardware (P: 888-647-0200 / Web: www.AandMHardware.com).
 - b. Size: Sized to correspond to countertop depth.
 - c. Provide fire treated solid wood blocking to support and secure brackets when installed at metal stud walls.
 - d. Load capacity shall be 1000 lbs per bracket, minimum.
 - 2. Grommets for Cable Passage through Countertops: 2-1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - a. Product: Subject to compliance with requirements, provide "EDP series" by Doug Mockett & Company, Inc., or approved equal.
 - b. Color: Black.

2.10 PLASTIC LAMINATE FINISH TYPES

- A. Plastic Laminate: Finish Type PL- #, as specified below.
- B. Type PL-1:
 - 1. Manufacturer: Wilsonart
 - 2. Product Code: #7965K-12
 - 3. Color: Walnut Heights

- C. Type PL-2
 - 1. Manufacturer: Formica
 - 2. Product Code: #5875-58.
 - 3. Color: Natural Weft

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION:

- A. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.03 INSTALLATION

- A. Separate Cabinet Bases: At the contractor's option, install separate cabinet bases prior to remaining casework as required to coordinate with installation of flooring and base.
- B. Provide and install scribe strips to adjoining walls, accurately fitted, installed with fastenings.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Hang wall cabinets straight, level, and plumb. Adjust fronts and bottoms to align in a single plane or straight line. Fasten to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions to provide positive anchorage. Align similar adjoining doors to align in a straight line.
- E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Repair or remove and replace defective work as directed on completion of installation.
- H. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.04 CLEANING:

- A. Remove and dispose of all packing materials and related construction debris.
- B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.

3.05 PROTECTION

- A. Protect completed work from damage during remainder of construction period.
- B. DO NOT stand on the installed countertops for any reason.

END OF SECTION

SECTION 12 36 61
QUARTZ SURFACING FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. Quartz surfacing countertops for manufactured casework and/or architectural cabinet work, including back- and end-splashes.
- B. Installation materials.

1.03 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 06 61 16 - Solid Surfacing Fabrications
- C. Section 07 92 00 - Joint Sealants
- D. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework
- E. Division 21 - Plumbing
- F. Division 26 - Electrical

1.04 SUBMITTALS

- A. Product Data: For countertop materials.
 - 1. Submit data for each specified product. Include manufacturer's technical data sheets and published installation instructions.
 - 2. Submit Safety Data Sheets (SDS) for adhesives and sealants.
- B. Shop Drawings: For countertops. Submit dimensioned shop drawings showing countertop layouts, backsplashes, vanities, joinery, edge conditions, terminations, substrate construction, cutouts, and holes.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
 - 3. Show plumbing installation provisions.
- C. Samples: Submit selection and verification samples for each color and pattern required.
- D. Qualification Data: For fabricator.
- E. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- F. Warranty: Submit specimen copy of specified warranty.
- G. Maintenance Data: Submit manufacturer's published maintenance and care manual. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.05 QUALITY ASSURANCE

- A. Applicable Standards
 - 1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI)
 - b. American Society for Testing and Materials (ASTM)
 - c. National Electrical Manufacturers Association (NEMA)
 - d. NSF International
- B. Fire Test response characteristics
 - 1. Provide with the following Class A (Class 1) surface burning characteristics as evidenced by testing identical products against ASTM E84 (UL 723) or another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Flame Spread Index: 25 or less
3. Smoke Developed Index: 450 or less
- C. Allowable Tolerances
 1. Variation in component size $\pm 1/8"$ (3mm) over a ten (10) foot length
 2. Location of openings: $\pm 1/8"$ (3mm) from indicated location
 3. Maximum $1/8"$ (3mm) clearance between quartz surfaces and each wall
- D. Regulatory Requirements
 1. Accessibility Requirements: Comply with the U.S. Architectural & Transportation Barriers Compliance Board ADA-ABA Accessibility Guidelines for Buildings and Facilities.
- E. Manufacturing Facility Qualifications: Quartz surfacing materials produced in an ISO 9001 certified facility.
- F. Fabricator Qualifications: Minimum of five years documented experience in fabricating quartz surfacing countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.
- G. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer as an acceptable installer.
- H. Mockups: Construct mockup (if requested by Architect) to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 1. Build mockup of typical countertop, 18-inches wide, full depth with backsplash, and partial cutout for an undermount sink.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage and damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.
- B. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by the manufacturer. Store quartz surfacing sheet materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of countertops and openings by field measurements[after base cabinets are installed but] before countertop fabrication is complete. Show recorded measurements on shop drawings.
- B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C).

1.08 COORDINATION

- A. Coordinate field measurements and fabrication schedule with construction progress.
- B. Coordinate locations of utilities that will penetrate countertops.

1.09 WARRANTY

- A. Manufacturer's Full Lifetime Warranty: Manufacturer warrants against manufacturing defects for the lifetime of the product, commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Quartz Countertops:
 1. Specified Manufacturer: Cambria.
 - a. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

- B. Integral Solid Surface Sinks:
 - 1. Specified Manufacturer: Dupont.
 - a. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

2.02 QUARTZ SURFACING

- A. Quartz Surfacing: Finish Type QTZ- #, as specified below.
- B. Type QTZ-1:
 - 1. Manufacturer: Cambria
 - 2. Design: Darlington
 - 3. Quartz Material Thickness: 0.80-inches (2 cm).
 - 4. Countertop Profile: Ridgeline (1/8-inch radius).
 - 5. Back- and Endsplash Profile: Ridgeline (1/8-inch radius)
 - 6. Finish: Matte.
 - 7. Performance Data:
 - a. Surface Burning Characteristics: (ASTM E84): 17, Class A
 - b. Smoke Density: Flaming 196, Non-flaming 69; ASTM E662
 - c. Compressive Strength (ASTM C170): 24,750 psi.
 - d. Bond Strength (ASTM C482): 205.
 - e. Breaking Strength (ASTM C648): 3,661 lbf.
 - f. Stain resistance: ANSI Z124.6: Unaffected.
 - g. Abrasion Resistance (ASTM C501): 223.
 - h. Moisture Absorption (ASTM C97): Passes.
 - i. Dynamic Coefficient of Friction (ANSI A137.1): Dry - 0.72 / Wet - 0.34.
 - 8. Conformance Standards:
 - a. NSF 51.

2.03 FABRICATION - QUARTZ SURFACING

- A. General: Fabricate components in shop, to greatest extent practicable, in sizes and shapes indicated according to approved shop drawings and in accordance with industry practice.
 - 1. Tools: Quartz fabrication shall include a CNC machine.
- B. Joints: Fabricate countertops in sections for joining in field.
 - 1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.
- C. Joint Seams: Form joint seams between quartz surfacing components with specified seam adhesive. Completed joints inconspicuous in appearance and without voids. Provide joint reinforced if required by manufacturer for particular installation conditions.
- D. Cutouts and Holes: Provide holes and cutouts for lavatories, sinks, fittings, service fixtures and similar countertop-mounted items as indicated.
 - 1. Form cutouts to required template or pattern, with smooth, even curves, eased edges, and radiused inside corners. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
 - 2. All internal cutout corners must have a minimum 1/4-inch (6.35mm) radius.
 - 3. Top and bottom of edge profiles and cutouts are recommended to have a minimum 1/16-inch (1.58mm) radius or chamfer.
- E. Countertops:
 - 1. Countertops shall be constructed of 2 cm (0.79 inch) thick quartz material over a 3/4-inch substrate, for a total thickness of 1-1/2 inches
 - 2. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 3. Laminations: Laminate layers of quartz surfacing as required to create built-up edges, trim, and other areas requiring additional thickness.

4. Supporting Countertop Overhangs:
 - a. Overhangs equal to or less than 12 inches: No support required.
 - b. Overhangs greater than 12-inches, but less than 18-inches: Support brackets required.
 - c. Overhangs greater than 18-inches, and up to 24-inches: Support brackets, supporting substrate, and support legs required.
5. Support Brackets:
 - a. Spacing of brackets: 24-inches on-center (maximum).
 - b. Place brackets 12-inches (304.8mm) from open ends, and against wall ends.
 - c. Brackets must be mounted to studs or high strength frame support.
6. Supporting Substrate: 3/4-inch (19.05mm) underlayment is required, support for underlayment can be affixed to cabinet
7. Support Legs: Shall be evenly installed at 36-inches (914.4mm) on-center, maximum.
- F. Backsplashes:
 1. Thickness: 2 cm (0.79 inch).
 2. Fabrication:
 - a. Shop-formed integral splashes with coved assembly between horizontal and vertical surfaces.
 - 1) Coved strip assembly shall be recessed into the deck 3-mm to eliminate 'feather' at glue line.
 - 2) Provide a formed scribe strip at top of backsplash to permit scribing to wall surface.
 - 3) Provide a shop-fabricated inside corner cove on an L-shaped return on countertops.
- G. End Splash: Match backsplash.
- H. Transaction Tops: Same as countertops.
- I. Identification: Material shall be labeled with slab information and imprinted with a manufacturer's identifying mark on the back.

2.04 INSTALLATION MATERIALS

- A. Mounting Adhesive: Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
 1. Provide spacers, if required, of type recommended by adhesive manufacturer.
- B. Joint Adhesive: Methacrylate-based adhesive for chemically bonding quartz surfacing seams. Color complementary to quartz surfacing sheet material. UL 2818 GREENGUARD Gold certified and complying with SCAQMD Rule 1168.
 1. Adhesives shall have a VOC content of 70 g/L or less.
- C. Elastomeric Joint Sealant (Silicone): Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications. Complies with ASTM C920, Type S (single component), Grade NS (nonsag).
 1. Color: Complementary to quartz surfacing color.
- D. Siliconized Acrylic Joint Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates. Complies with ASTM C 384, Type OP, Grade NF, and SCAQMD Rule 1168.
 1. Color: Complementary to quartz surfacing color.
- E. Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.
- F. Solvent: Product recommended by adhesive manufacturer to clean surface of quartz surfacing to assure adhesion of adhesives and sealants.
- G. Cleaning Agents: Non-abrasive, low pH cleansers.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates to receive quartz countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops. Substrates must be sound, flat, smooth, and free from dust or other surface contaminants.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install quartz surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to the manufacturer.
 - 1. Fasten quartz surfacing components to base cabinets or other supporting substrates with suitable adhesives acceptable to manufacturer.
- B. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
 - 1. Clamp or brace quartz surfaces in position until adhesive sets.
- C. Sinks:
 - 1. Install undermount sinks or bowls to countertops using appropriate adhesive, sealant and mounting hardware.
- D. Fill gaps between countertop and terminating substrates with specified sealant.
- E. Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.

3.03 REPAIRS

- A. Minor surface marring for quartz surfacing components may be repaired according to manufacturer's published installation instructions.
- B. Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

3.04 CLEANING

- A. Clean quartz surfacing components according to manufacturer's published maintenance instructions.
- B. Completely remove excess adhesives and sealants from finished surfaces.

3.05 PROTECTION

- A. Protect completed work from damage during remainder of construction period.
- B. DO NOT stand on the installed countertops for any reason.

END OF SECTION